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ABSTRACT

The study examined the influence of financial sources on field of study decisions of non-sponsored and sponsored students from developing countries at both the graduate and undergraduate levels. Findings are based on analysis of survey responses of 868 foreign students from five countries (Brazil, Egypt, Indonesia, Jamaica, and Nigeria) studying at 20 U.S. colleges and universities. Major findings included the following: (1) a large proportion of foreign students are nonsponsored but sponsorship is dramatically more important for graduate students than for undergraduates; (2) for students receiving sponsor assistance, there has been an inadequate attempt to leverage funding by making use of personal, family, or institutional resources; (3) the relationship between sponsorship and the intention to return home is strong and could probably be increased by tying some aid to employment/return requirements; (4) there is no evidence that sponsorship has been effective as a force to redress inequities or promote social inclusion of under-represented groups; (5) sponsor support does influence field of study choices; and (6) better means are needed to provide incentives and information to students to promote congruence between their preferences and the goals of sponsoring institutions. Data are detailed in 28 tables. Includes 13 references. (DB)

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IIE Research Report Number Nineteen

sponsorship and leverage

SOURCES OF SUPPORT AND FIELD OF STUDY DECISIONS OF STUDENTS FROM DEVELOPING COUNTRIES

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Introduction

In 1987-88, approximately 356,000 foreign nationals were enrolled in postsecondary degree credit programs in American colleges and universities. For many of these students, a proportion of their education and maintenance costs was financed by a sponsoring agency — their own government, their employers, or a private or public donor agency or foundation. Sponsorship of such "participant training" activities has long been a major program activity of the U.S. Agency for International Development (USAID).

In addition to these "sponsored" students, American colleges and universities annually receive substantial numbers of nonsponsored students. Well over fifty percent of the students from some countries who pursue degree studies in the United States do so with the cost of attendance (net of institutional subsidies) financed by their families, from the students' own savings and earnings, or from the incurrence of loan indebtedness.

The research presented in this report was commissioned to ascertain the answers to two research questions:

1. What is the nature and degree of association between the forms of foreign student finance and field of study decisions, and does this association differ significantly between undergraduate and graduate students?

2. How can the above findings provide assistance in formulating policies for sponsoring agencies in regard to the nature and level of financing and the restrictions to be placed on field of study choices?

Because the sponsorship of foreign students is related to problems of manpower in developing countries, this exploratory study focuses on a sample

population drawn from five such countries. The study explores the association between two primary sources of support — sponsorship and family/personal support — and the fields of study of the foreign students. Responses were collected from a sample of more than 800 foreign students; these responses cover field of study choices and the relationship of these choices to financing, level of study, post-schooling plans (further education and the form and location of employment), and a set of personal, academic, and demographic characteristics. The financing issue is dealt with in terms of sponsored/nonsponsored status, the primary source of support, and the tendency to rely on multiple sources of support (i.e., finance "packaging").

To understand the importance of these data and establish the rationale for the structure of the later analysis, it is necessary here to present a brief background discussion of the conceptual and behavioral context within which sponsor and student decisions are made. For example, to understand why the degree of association of sponsorship and field of study choice is a critical consideration, one must understand why sponsors fund foreign students from developing nations. The major reasons are as follows:

1. Encouraging human resource development that will support national social, economic, and political development;

2. Encouraging human resource development in support of projects supported by the sponsor or other donors;

3. Promoting improved understanding and goodwill between the countries that *send* students and those that *receive* them;

4. Promoting expanded economic interrelationships;

5. Supporting a more general diplomatic agenda (training as a form of general rather than development-oriented foreign assistance).

As is common in most policy analyses, the motives of the major actors are rarely simple — involving, instead, a combination of the various possible rationales. None of the rationales of the sponsors requires the imputation of altruistic motives, and yet such motives may operate as part of all of them. This also applies to the students' motivation for overseas study. While common student concerns may be personal financial or status advancement, these motives are not necessarily inconsistent with desires to assist in national development, to serve the community, or to aid the extended family. Therefore, analysis of sponsorship effects must be conducted within the context of the

interaction of sponsors' priorities and students' understanding of their own interests, broadly defined to include familial, community, and national considerations.

The field of study choice has been selected as the critical variable for this study. Ideally, one might also wish to ascertain the relationship between sponsorship and academic success (attainment and achievement) and later productivity effects (including changes in attitudes and behavior). In any event, the methodological limitations on such research are paralleled by the informational limitations faced by the two sets of decisionmakers, sponsors, and students. Thus, improved understanding of the relationship between sponsorship and field of study choice does have significant policy relevance, since immediate field of study choices are the only variables over which sponsors and students have direct influence.

The field of study choice issue for undergraduate students may appear less critical than for graduate students. To the extent that undergraduate specialization does not foreclose graduate education or employment opportunities, this may be correct. There are, however, certain undergraduate specializations (in the natural sciences, mathematics, engineering, and health fields) that are essential for subsequent education and employment.

Data presented here will show that sponsorship is a minor factor in undergraduate financing. This finding is consistent with recent changes in donor and developing country policies. With the creation and expansion of indigenous higher educational institutions, the emphasis in foreign education support in most developing countries has begun to shift from undergraduate toward graduate education. Even in those countries where both undergraduate and graduate education now exist, there are certain fields of study in which, because of costs or student demand, the economies of scale are insufficient to justify creation of a degree program. In these cases, foreign education remains a favored option. Fields of study in which this situation is most frequent are the natural sciences, engineering, and advanced health training.

Data presented below will indicate that undergraduate education in the United States remains a popular option for nonsponsored students. Thus, the field of study decision at the undergraduate level remains an important policy issue for certain individual students and receiving institutions, as well as for the sending countries (to the extent that these students return to participate in the home society). However, since the focus of the immediate survey is on the efficacy of sponsorship, the undergraduate patterns will receive less attention than will those of the graduate student population.

If the link between sponsor-provided funds and choice of field of study is to represent an indicator of sponsorship efficacy, one must consider the role of

information and incentives in more detail. As noted by Windham (1979), educational incentives have both a potential and a realized effect. The difference between these two effects is determined by the extent of information dissemination about the incentives. While this study is restricted to a simpler incentive-result analysis, one must keep in mind that the intervening variable of information (about availability of funds, actual program costs, and institutional quality and effects) must be considered in the formulation of policies to remedy observed weaknesses and to build upon observed strengths of the current sponsor-financed higher education subsidies.

As a first step in examining the incentive context for foreign study, one must consider the students' perception of cost and benefits. With regard to cost, student behavior is determined by the perception of net personal cost, i.e., the cost the student (and family) will pay after the deduction of institutional subsidies and sponsor financing. Less sophisticated students may be misled into thinking that the nominal cost of education at a certain institution should be their prime consideration. There are two main cost-analysis objections to this (apart from the tenuous relationship between aggregate institutional cost levels and specialized field of study quality). First, the students will rarely know what full-cost is. Almost all institutions, public and private, subsidize instruction and maintenance expenses for their students. While these subsidies usually are more substantial at public institutions in the United States, they exist at all but the most profit-oriented proprietary institutions. Second, the stated tuition, fees, and other charges must be considered simultaneously with the institution's provision of scholarships, fellowships, assistantships, other employment opportunities, and subsidized and unsubsidized loans. A product of this simultaneous consideration of institutional subsidies and institutional costs is the level and form of financing to be borne by the individual student. It is this perceived level of individual cost which, when compared with anticipated benefits, should determine the student's choices of institution and field of study.

It is worth noting here that at most U.S. institutions, student charges do not vary significantly by field of study. At only a few institutions (the University of Minnesota is a leading example) has there been an attempt to differentiate charges by field of study in line with the differences in the cost of provision of instruction and other services. (See Yanikoski and Wilson, 1984.) Insofar as there is such price differentiation, students must consider field of study cost comparisons and not just institutional cost comparisons before reaching a final decision on their higher educational plans.

As for benefits to the students, the field of study choice obviously makes an important difference. Students must consider both productivity and labor market issues. First, they must ascertain what fields of study are most appropriate to their interests, abilities, and aptitudes, including the critical foreign student concern of English language skills. Second, the students must make certain

assumptions about the future labor market demand and supply conditions for persons like themselves after completing various fields of study. Considerations of job search periods, initial wages, possibilities for advancement, and probable lifetime earnings patterns all will enter into these considerations. As noted earlier, the individual students may also consider the effect their education will have on their ability to serve national, community, and familial interests.

Given this decisionmaking process on the part of the student, the linkage of sponsorship to field of study choices has great potential relevance for policy. The sponsor's offer of financial assistance may have the effect of altering not just the costs but also the benefits to the future students, by changing the field of study choice that the students might have made based on their individual preferences. Thus, some students may have to compromise their expected benefits in order to acquire the funding necessary to participate in foreign study programs. Data to be presented here will allow an examination of the degree of constraint actually imposed by sponsors and of the types of students and fields of study most affected by the imposition of these constraints.

A major policy issue in regard to sponsor subsidization of foreign students is whether the money used for such subsidization is expended efficiently. One issue is whether "extramarginal" subsidization occurs; this is defined as provision of subsidization beyond the amount necessary to affect students' behavior in terms of enrollment and field of study choices. An example will help illustrate this principle.

Assume that the annual total cost (for instruction and maintenance) for a program of study that a student prefers is $6,000 per student and that for a particular student (or group of students) an institutional subsidy in the amount of $1,500 per year is available. Thus, the net cost to the student would be $4,500. Also assume that the student's own and family resources are adequate to provide $1,500 per year for educational and maintenance expenses. The net amount necessary to be provided by the sponsor in order to permit the student to attend this program of study is only $3,000 per year ($4,500 minus $1,500). Yet many sponsor-subsidized activities do not expect the student to contribute anything and the majority do not require even that the student apply for available institutional funds. In the above example, any amount provided by the sponsor in excess of $3,000 is an "extramarginal subsidy" — more than is required to facilitate enrollment.

Now, if the example is changed so that the figures presented are for a program of study that is not the student's first choice, then the calculation of the "extramarginal" subsidy would change. One might then add a further assumption that the student would require an additional $1,000 subsidy before agreeing to change from his/her personally preferred institution or field of study to one preferred by the sponsor, and any amount greater than $4,000 would represent

an extramarginal subsidy ($3,000 for enrollment costs and an additional $1,000 in compensation for selecting other than one's priority institution or field). However, it is rare that the options available to a potential foreign student are such that the incentive compensation is necessary. Quite often a student would accept the original $3,000 subsidy even if it required a less than optimum choice in terms of personal preference.

The question is: which sources of financing should be exhausted before the sponsor's funds are used? To maximize the total number of students educated, the sponsoring agency should attempt to maximize use of institutional and student funds before allocating its own. This is comparable to how U.S. higher education institutions treat federal and personal sources of support for domestic students. Given the obvious inefficiency of fully funding student costs without regard to institutional and personal sources, why do sponsors often ignore these alternative means of financing foreign study?

First, there is an administrative explanation. Even a minimal calculation of financial need requires the imposition of a need determination system. Given the uncertain and delayed receipt of institutional assistance and the difficulty, especially in developing nations, of documenting personal and family resources, many administrators of sponsored assistance believe that the savings to be gained from better targeting or leveraging of their own funds would be offset, at least in part, by the costs of administering the need-based program. In addition, the current program of fully funding all students has the benefit of *apparent* equality of treatment, even though it is often asserted to be, in fact, inescapably inequitable.

Other objections relate to the earlier-stated rationales for sponsorship. The training may be seen more as a reward than as an investment, and full funding therefore is a basic perquisite. Alternatively, the sponsors may want to minimize the distractions that might be caused by demands on the student for work or debt incurrence. In addition, one aspect of foreign student subsidies is, in fact, a subsidization of the institutions and programs they attend as much as it is of the students. Finally, since training foreign students may cost institutions more than training domestic students, sponsor full funding may be, in part, a device to minimize any disincentives institutions have for accepting foreign students.

Are there any countervailing reasons that are sufficiently cogent to justify policy consideration of reducing the level of extramarginal subsidization? There appear to be two such reasons. The first relates to aggregate manpower production. By reducing unnecessary subsidization, the sponsors can increase the number of students that are supported. In the example offered above, the sponsor would originally be paying as much as $6,000 per year per student (assuming no institutional, personal, or family contribution). If, instead, the

subsidy were reduced to $4,500 (net of institutional support) or $3,000 (net of institutional, personal, and family support), the sponsor could increase the number of students assisted by 33.3 to 100 percent. In each situation, the actual effect of reducing extramarginal subsidies would have to be determined on a case-by-case basis; however, the direction of the effect is always to increase the potential number of students who could be assisted.

The second countervailing reason relates to the types of candidates sent for foreign training. The research presented here will examine whether sponsored and nonsponsored students differ in terms of a variety of socially relevant background characteristics. However, we can be sure in advance that the present full funding model encourages cautious and conservative attitudes toward whom one selects for a program, and the tendency has been, therefore, for urban males from advantaged socio-economic class groups to dominate. Accordingly, any increase in the number of students assisted will certainly increase the *probability* of receipt of aid among the presently underrepresented groups (women, economically disadvantaged individuals, those from rural areas, and ethnic minorities).

The question is not whether it is possible for sponsors to leverage their funding, but whether the potential benefits of such leveraging are sufficient to overcome administrative and policy inertia and the variety of legitimate concerns about need-based funding that were mentioned above. The research that will be presented here cannot provide a definitive answer to this question but it can indicate the extent to which leveraging potential may exist. The major topics the analysis will examine are the extent to which sponsored and nonsponsored students differ, whether these differences are indicative of potential extramarginal subsidization by donors, and whether current levels and patterns of sponsor subsidization have a significant effect on student choices of field and on the probability of the students returning to their home nations after graduation. The data in the present study allow one to examine both student behavior (the programs they actually are enrolled in) as well as their perceptions (student opinions on the effects of field of study constraints).

The study is timely and important. First, national governments and private organizations already are allocating substantial sums to support overseas training for students from developing countries. Of the 356,000 foreign students enrolled in the United States in 1987-88, an estimated 8.7 percent were financed primarily by their home governments, 2.0 percent were supported primarily through the U.S. government, and 5.2 percent received most of their financing from foreign or U.S. private agencies. Students "sponsored" primarily by governments and agencies, therefore, comprised about 10.8 percent of all foreign nationals attending U.S. colleges and universities (*Open Doors* 1987/88). In 1987, alone, the U.S. Agency for International Development provided more than $120 million in support of foreign students (Method, 1988).

The aggregate data clearly indicate the potential significance of the source of financing on foreign student enrollment and field of study choices in U.S. higher education. Yet, with just a few noteworthy exceptions, studies of foreign student participation in U.S. higher education have lacked an adequate conceptualization of the interaction of individual, institutional, sponsor, and national needs that is a prerequisite if the research is to facilitate improved results for both the sponsoring agencies, the institutions, and the students. Indeed, given the prospect of stability (if not decline) in enrollments from the traditional domestic college-age cohort, there are likely to be opportunities for greater access by foreign students to many U.S. institutions in particular fields of study.

The immediate need is for research that will not simply identify issues emerging from this potential overseas training — most administrators in donor agencies and in U.S. higher education, as well as the foreign students themselves, appear sufficiently cognizant of the nature and seriousness of the problems that exist in matching student needs with institutional programs. Rather, what is needed is research that is designed to satisfy the major constraints on improved decision making by all participants and enhanced educational opportunities for foreign students in the United States: (1) improved information on costs, financing, and probable effects, and (2) better articulated and more effective incentives for students, faculty, institutions, host and sending country governments, and private sponsors.

The present study aims to improve understanding of the effects of one key incentive in foreign student field of study choices— the source of financing. If home country governments and donor agencies are to assess whether the sums invested are effective in generating adequate numbers of trained graduates with specific skills and competencies, the field of study decisions of non-sponsored and sponsored students need to be understood. A better understanding of the association between the source of support and field of study decisions will help sponsors decide whether changes in award criteria or amounts ought to be considered. Such changes should promote efficiency in two ways: (1) by providing support in amounts sufficient to encourage the desired number of foreign students to choose designated fields of study and with restrictions so limited as not to discourage them; and (2) by ensuring that students from selected target groups (e.g., females from disadvantaged and/or rural background) choose to enroll in these fields. These objectives must be served within existing budget constraints and established program goals. Thus, any assessment of the association between sources of financing and field of study choices should consider the extent to which the overall objectives of donors would be served *without* their financial support. This would allow for a pattern of funding that maximizes the marginal (i.e., additional) effectiveness of donor funds and reduces the wasteful provision of incentives for choices the student would have made in any case.

The appropriateness of the sponsors' selections of fields of study eligible for support is an important issue, although it is not directly addressed in this study. For many subject areas, especially at the undergraduate level, sponsors' criteria create few opportunity costs in terms of restricting the appropriate match of student interest and ability with institutional programs. In many forms of employment, the contributions by graduates to organizational productivity are likely to be enhanced equally by training in a wide variety of academic fields. However, some positions in selected occupations may require specific skills which can be developed only through more narrowly specified fields such as engineering, physical and life sciences, and computer science. These more specific employment requirements justify providing sponsor support contingent upon student participation in particular fields. Note, however, that if graduates in these fields are employed in jobs that do not require their more narrowly developed skills, part of the sponsored aid may be wasted (a loss occasioned by the competencies graduates could have acquired had they enrolled in more appropriate, or less costly, fields).

Summary

The research presented in this report was commissioned to ascertain the answers to two research questions:

1. What is the nature and degree of association between the forms of foreign student finance and field of study decisions, and does this association differ significantly between undergraduate and graduate students?

2. How can the above findings provide assistance in formulating policies for sponsoring agencies in regard to the nature and level of financing and the restrictions to be placed on field of study choices? More specifically, might sponsoring agencies accomplish a range of important objectives if they provided only partial funding to foreign students? Would such partial funding permit increased participation of underrepresented groups?

Because the sponsorship of foreign students is related to problems of manpower in developing countries, this exploratory study focuses on a sample population drawn from five such countries: Brazil, Egypt, Indonesia, Jamaica, and Nigeria. The degree of association of sponsorship and field study choice is a critical consideration for the following reasons:

1. To encourage human resource development that will support national social/economic/political development;

2. To encourage human resource development in support of projects supported by the sponsor or other donors;

3. To promote improved understanding and good will between the countries that "send" students and those that "receive" them;

4. To promote expanded economic interrelationships;

5. To support a more general diplomatic agenda (training as a form of general rather than development-oriented foreign assistance).

In summarizing the research results from this study, six main categories of findings may be identified as follows:

1. A large proportion of foreign students are nonsponsored but sponsorship is dramatically more important for graduate students;

2. For those students receiving sponsor assistance, there has been an inadequate attempt to leverage funding by making use of personal, family, or institutional resources;

3. The relationships between sponsorship and the intention to return home is very strong, and though even among nonsponsored students the proportion intending to return is large, it could probably be increased by the provision of small proportions of sponsorship aid tied to employment/return requirements;

4. Regardless of the extent to which sponsorship is presently being used as a force to redress extant inequities or to promote social inclusion of under-represented groups, there is no evidence from our study that sponsorship has been effective in these regards, even though there are indications that such funding could serve these purposes;

5. Sponsor support does influence field of study choices, and the overall influence is probably greater than indicated by the student responses to the survey's questions about direct sponsorship effects, because financing complements other influences on the student choice process; and

6. The residual policy problem is to identify better means to provide incentives and information to students so as to promote a better congruence between their abilities and preferences and the goals of the sponsoring agencies and institutions.

The research shows a significant set of relationships between sponsorship and field of study decisions, although these relationships are moderated by a variety of factors like the gender of the student; the form of financing; the level

of study (undergraduate versus graduate); student attitudes, backgrounds, experiences, and plans; and even factors specific to the nation of origin.

While the complexity of the relationships makes policy analysis difficult and its application provisional, a variety of possible policy alternatives have been identified. Most important, it has been shown that less-than-full funding schemes for foreign students deserve consideration. In the first place, these may increase efficiency. Further, they may not only increase equity, through greater social inclusion in the foreign student funding process, but also enhance the probability of return to the home country by students who previously were entirely self-supported.

1. Sources of Financing

The influences on field of study decisions are complex and varied. However, according to Chapman (1981), the factors most likely to influence field of study decisions are: (1) individual aptitude and attitudes; (2) the nature and emphasis of precollege schooling; (3) expectations about employment upon graduation (initial and later earnings, location of employment); (4) the availability and costs of particular programs; and (5) sources of financial support (from family income and wealth or from nonfamily sources).

For field of study decisions by foreign students at U.S. colleges and universities, these factors will differ in form and in significance. At a minimum, the foreign student is unlikely to have access to information of a quality or coverage comparable to that available to most domestic students in the United States. Also, some factors exist that are specific to the foreign student's situation. For example, English language difficulties incline some foreign students to enroll in fields (like mathematics, engineering, and the sciences) which require less dependence on verbal skills. Students who are uncertain whether they will return to their home countries may have a preference for training in those fields that provide greater opportunities for employment in the United States (or elsewhere) and not just those appropriate to their own countries' needs. Also, foreign students may seek to enroll in U.S. colleges or universities because institutions in their home countries are not able financially to support high quality training in certain fields (when, for example, enrollments in particular fields in the home country institution are insufficient to provide adequate economies of scale).

It seems likely that the availability of financial support from sponsors is especially important in enrollment and field of study decisions of students from developing countries. Thus, those able to receive substantial support from their families are more likely to choose freely among subject areas according to individual interests and abilities as well as employment prospects at home or

abroad.* Correspondingly, those who lack access to such sources of financing may find their choices constrained by the criteria imposed by sponsors, including specifications for the fields in which they may study and requirements for their employment in the home country following graduation. The force of specifications and requirements is a matter of degree; even students relying solely on family sources, for example, may have to submit justifications for their intended program of study to government officials before they are permitted to obtain exit visas or to convert local currency for the limited amount of foreign exchange currency available in their home countries. Also, some who accept aid from sponsors may hope to circumvent such restrictions as future obligations to return to the home country or to accept post-graduation employment in particular agencies or locations.

From the foregoing discussion, two important generalizations may be drawn. First, decisions to enroll and to choose particular fields are made, in the last analysis, by students, not sponsors. As Dresch (1987) points out, "...even when a third party intervenes, the student must agree to the arrangement, i.e., conceive himself as benefiting from study in the U.S." The critical issue is that the less other information is available, and the more dependent students are on nonfamily sources of support, the more constrained their choices will be. Foreign students may be assumed to make rational decisions, weighing the expected net costs to themselves (i.e., net of sponsor or college financing) against the perceived benefits to themselves of pursuing a particular field of study in the United States. Given this assumption, it follows that sponsors can affect field of study choices primarily by altering the nature and scope of benefits, and the net cost of available alternatives. Second, field of study choices of foreign students result from the combined influences of a number of factors, one of which is the level and form of financing.

The field of study decision thus depends not only on the source, level, and form of financing but also on the available opportunities for post-school employment and the student's own abilities, interests, and aspirations in employment and nonwork activities (e.g., child rearing). Importantly, financing and, to a lesser extent, the conditions and remuneration in employment following graduation, are manipulable through sponsor or government policy. The accuracy and timeliness of information about academic programs, financing, and post-school employment prospects are also crucial and manipulable. It follows that any attempt to understand the extent to which choices of nonsponsored students differ from those of sponsored students must take into account these other influences. Specifically, one can expect field of study choices of foreign students to be associated primarily with academic level (undergraduate versus graduate),

*Even within families, there may be a lack of congruence between the interests of the family and the student's own interests and plans. This is especially important in developing countries where the family's decision to support the student is often an investment decision and is based on the assumption that the student will "repay" the family in the future.

post-schooling plans, and sources of financing (sponsored versus private). These are the principal dimensions explored in the analyses presented below.

Design and Methodology

A thorough study of the field of study choices of nonsponsored and sponsored students, and the link between these choices and sponsors' goals (such as human resource development for economic growth) would require comparable information collected over several years from relatively large numbers of students for each country of interest. Given the limited resources available for the present project, the purposes of this study were more limited. The study was designed to test a methodology for undertaking a larger examination of financing and field of study choices and to yield suggestive, if limited and initial, findings about the role of financing in such choices.

This exploratory study is based on an analysis of survey questionnaire responses provided by 868 foreign students from five countries studying at 20 U.S. colleges and universities. Items in the four-page questionnaire asked the student to provide details on their academic, employment, and family backgrounds; current academic program; whether their current field of study was their first choice; the reasons why they selected their current program; the sources and amounts of funds they used to meet their costs of training; and their employment plans.

With respect to the principal research question—the association between financing sources and field of study choices—the survey generates information both on student *perceptions* of the linkages and on differences between sponsored and nonsponsored students in the *actual patterns* of enrollments by field. Both forms of information are more indicative than definitive. Since students may be reluctant to reveal their true perceptions (out of fear of a loss of financial support or withdrawal of permission to continue their studies in the United States), their reports of influences (even under researcher assurance of anonymity) on their choice of fields may not be accurate. Further, since one cannot know whether sponsored students would have enrolled in the same field without being sponsored, simple comparisons between sponsored and nonsponsored students may not reveal fully the extent to which their choices do, in fact, diverge. That is, some students receiving aid from sponsors might have enrolled in the same field had there been no donor support. Whether this occurs would be addressed best by examining differences in actual enrollment choices of otherwise similarly situated students whose available sources of funding (sponsored versus private) change over time (e.g., increase/decrease in aid from sponsors) or differ across countries (high aid from sponsor/low aid from sponsor). The approach that it was practical to adopt here — drawing both on student perceptions and on observed patterns of enrollment — may not provide

estimates as compelling as those that would be generated through a more extensive examination of observed behavior. However, the analyses presented here do permit useful, meaningful, and defensible inferences to be drawn and represent a cost-effective methodology for the initial examination of this policy area.

The five countries of origin of the students selected for study are Brazil, Egypt, Indonesia, Jamaica, and Nigeria. These countries were selected using criteria that gave considerable weight to geographic diversity, the level of USAID involvement or interest, and the aggregate number of students from the country enrolled in U.S. higher education.

By design, the survey effort was limited to the twenty U.S. four-year colleges and universities enrolling the largest numbers of students from the five selected countries. Restricting the number of participating institutions enabled the project staff to secure more quickly the necessary institutional approvals for access to student addresses and the cooperation of the institutions' foreign student offices. All twenty of the selected institutions agreed to participate in the survey effort.

Due to the selection criteria, all of the sample institutions are relatively large universities. Total enrollment at these institutions ranged from under 5,000 to over 35,000. Across all twenty institutions, total enrollment averaged nearly 25,000. The characteristics of the participating institutions are displayed in Table 1.

Six of the twenty institutions in the sample are privately controlled. This share is somewhat smaller than the 36.0 percent of all universities that are private. The institutions reflect the geographic distribution of universities, with the Midwest somewhat overrepresented and New England and the Northeast underrepresented. Foreign students in the sample institutions accounted for about one-eighth of all foreign students enrolled in four-year universities in the United States during 1986-87. Foreign students in the survey represented more than 7 percent of total enrollment in the sample institutions, compared to an estimated 2.8 percent share in all U.S. universities. This difference reflects the nature of the sampling process for institutions.

An estimated 26 percent of all those surveyed returned questionnaires. This response rate incorporates adjustments for questionnaires sent to inaccurate addresses or to those that fell outside of the scope of the survey. The details on response rates are provided in Table 2. Of the 3,540 questionnaires sent out, 164 were returned as undeliverable. In almost all cases, these surveys were sent to students at an address at which they no longer lived and from which they had left no forwarding address. An unknown number may have provided forwarding addresses but never received the questionnaire at their new ad-

dresses (e.g., if they had returned to their home countries). Another 112 questionnaires were sent to individuals who, in fact, fell outside the study's frame (i.e., students from countries other than the five chosen for the study and individuals from target countries who are in the U.S. as visiting faculty or guest scholars). These respondents were excluded in the analyses.

Considering the study's design and the diversity of its student population, the response rate appears to be reasonable. The study embraced a modest series of strategies to encourage a high response (e.g., contact and visits with foreign student offices, cover letters from the institution and from the Institute of International Education (IIE), and a postcard follow-up). While partly effective, the strategies do not appear to have been sufficient to overcome some of the problems in survey administration and the identified reluctance of foreign students to respond to surveys. Two problems emerged. First, some of the participating institutions simply lacked the resources necessary to assist effectively in a survey effort of this magnitude. Limited institutional capacity for assistance was demonstrated at several colleges by the inability to produce accurate computerized mailing lists for their students. This difficulty was further compounded for those institutions which, due to concerns about student privacy, insisted on conducting the initial survey and follow-up themselves.

The often alleged reluctance of foreign students to respond to the survey was reinforced by the timing of this data collection exercise. The survey was conducted in the spring term of 1987. At some institutions, this survey followed several other surveys of foreign students (*four* other surveys at one university). Further, while most students received the questionnaire shortly after mid-term exams and before spring vacation, the survey may have competed not only with classwork but also with requirements associated with the end of the academic year (e.g., assembling academic records; correspondence and interviews with prospective employers or with programs for further higher education; arrangements for travel home). The survey effort might well have elicited a larger response had questionnaires been sent in the fall academic term. However, a fall administration has the disadvantage of requesting details on costs and financing before all students have incurred their total expenses or received all of their support for the year.

The practical implication of a reduced response rate is to constrain the level of confidence which may be placed in tabulations or parameter estimates. Specifically, confidence in the statistics may be reduced because one cannot be assured that those who did not return questionnaires would have responded in the same way as those who did. A larger and more generously financed endeavor might consider a special study of initial nonrespondents to determine whether their exclusion represents a significant bias in terms of the survey parameters.

In spite of the response rate, there are several reasons why the collected

information can be analyzed with somewhat greater confidence than is implied by the response rate alone. First, the quality of the collected data is quite good. Most of the returned questionnaires were usable. As shown in Table 3, the analysis sample comprised of the respondents from the five identified countries who provided acceptable information on finances (excluding those reporting amounts above $50,000 from any source) includes an estimated 93 percent of the full respondent sample. Other student surveys in which detailed financial information has been requested generally have had a ten to twenty percent sample loss because of cases of insufficient and inconsistent information provided for analysis. In this respect, the proportion of the sample used in this analysis appears to be comparable or superior to that found in similar domestic U.S. survey efforts.

Second, the study was not intended to generate statistics that would be directly generalizable to a specified sending nation population of students. Rather, the student survey was designed to provide illustrative findings on the association between field of study choices and sources of financing. Given the way institutions were selected and countries chosen, any revealed associations would not necessarily be generalizable to the population of students in the identified countries (let alone all foreign students). Nonetheless, institutions in the sample enrolled about one-eighth of all students enrolling in four-year colleges or universities in the United States. Thus, in spite of the possible bias introduced by the pattern of responses, the findings do provide the "illustrative" results originally envisioned.

Third, some information about non-respondents is available. Most participating institutions provided information on the financing profile of students from each identified country by academic level. When combined with additional information from *Open Doors*, the profiles of the survey sample permit some inferences about the characteristics of those who did not return the questionnaire. As shown in Table 4, for example, foreign student respondents included in the sample are distributed in patterns similar to those of all foreign students attending four-year institutions. For example, the proportion of males is 76.5 percent and 65.5 percent, respectively, for graduate students and undergraduates in the sample compared to 68.9 percent overall share as estimated from IIE's 1986/87 Annual Census. The sample differs from the overall distribution by marital/dependency status in expected ways (i.e., graduates are more likely, undergraduates less likely, to have dependents or to be married). Further, the distribution of respondents in the sample according to their declared fields of study also generally differ in reasonable ways, given the sample restriction to doctorate granting institutions, from the overall distribution estimated from the IIE Annual Census. Indeed, given the constrained nature of the survey sample, the general correspondence between the distributions of respondent characteristics in the sample and in the Annual Census is quite reassuring.

In summary, findings generally, and for some subgroups in particular (e.g., graduate students), can be interpreted with greater confidence than would be implied by the response rates alone. In addition, response rates for graduate students from Brazil and from Indonesia (at 54.0 percent and 66.3 percent, respectively) appear to be high enough to ensure additional confidence in the robustness of the statistics generated for those two countries.

Results and Findings

The data collected in this study provide considerable information on the patterns of financing and field of study choices of foreign students. The collected information is presented in three parts. Chapter One contains details on the sources of financing used by foreign students. In Chapter Two, patterns in field of study choices by sponsored and nonsponsored students are presented and discussed. Chapter Three contains tabulations of the reasons the students themselves reported for enrolling in their current fields of study.

Each year, colleges and universities provide IIE with estimates of the primary sources of support utilized by foreign students. The data suffer from a relatively high non-response (colleges often are simply unable to develop the estimates) and an unknown degree of error in the figures actually reported because verification procedures are not feasible for this population. In any case, such aggregate data are not appropriate for the examination of the policy issues that gave rise to this exploratory study.

The IIE data suggest that some two-thirds of all foreign students finance their studies privately with funds from their families and their own savings. Sponsors have seldom accounted for a large share of support for foreign students. As indicated in Table 5, these overall patterns have not changed dramatically over the past decade.

What has changed is the support derived from other sources, namely from U.S. colleges and universities. Since 1981, the number of foreign students financed by U.S. colleges and universities doubled from 26,000 to 52,800 in 1986/87. Perhaps 30 percent of all foreign graduate students receive some college-awarded support, a proportion that itself has probably doubled since the mid-1970's (estimates developed by Windham and Wagner, 1987).

The present survey collected more detailed information on the sources used to finance foreign students at U.S. colleges and universities. The details permit an examination of financing along several dimensions—the sources most commonly used and their relative importance; the types of support (grant/scholarship, work, loan, earnings, savings); the nation providing such support; and the types of financing "packages" (combinations of support provided from several sources for a single student). These dimensions are explored below.

Sources of Financing

What sources are used to finance college- or university-related expenses of foreign students? Aggregate sources, generally corresponding to categories used in IIE's annual *Open Doors* survey, are listed in Chart 1. According to information supplied by respondents (presented in Table 6), substantial proportions of foreign students support their studies in the U.S. through personal and family sources, although, at the graduate level, college/university-provided financing and support from sponsors also is important.

Chart 1
A Classification of Sources of Financial Support

Personal and Family
- Savings
  - in the U.S.
  - outside the U.S.
- Spouse/partner
  - in the U.S.
  - outside the U.S.
- Parents/relatives/guardian
  - in the U.S.
  - outside the U.S.

Home Government/University
- Scholarship or Grant
- Loan

U.S. College or University
- Scholarship or Grant
- Assistantship
- via State

Foreign Private Sponsor
- Employer Grant
- Employer Loan
- Other

U.S. Government
- via U.S. Agency
- via Home Government

Current Employment
- in the U.S.
- outside the U.S.

U.S. Private Sponsor

Most particularly, over half of all graduate students in the survey drew on their own savings or a private loan or support from their spouses or relatives (including parents) to finance college expenses. More than a third, however, were supported, at least in part, by their home government or university and some 30 percent received support from the university they attended. In contrast, almost all undergraduate respondents (an estimated 92.4 percent) reported support from personal or family sources, with very small proportions receiving support from other financing sources (4.6 percent from home country government/university and 10.4 percent from a U.S. college or university). This reflects an increasing preference of sending nations to provide initial degree training in their own systems and to restrict foreign study subsidization to graduate education. The justification for this training priority is reinforced by the aforemen-

tioned economy-of-scale issue relative to specific, high-cost graduate programs and especially those requiring expensive capital or equipment expenditures and scarce personnel.

Composition and Packaging Sources of Support

The relative importance of a particular source in financing foreign students may be further evaluated by comparing the average amounts received from each source and that source's share of the total amount received. As shown in Table 7, of the average of $14,690 received by graduate student respondents, nearly $6,000 came from private sources ($5,147 in personal and family support; $847 from current employment outside of the college). Thus, private support provided about two-fifths of the average funds reported by graduate students in the survey. U.S. colleges and universities, through grants, stipends, and assistantships, allocated an additional $1,884 (12.8 percent of all support reported by respondents). All sponsors—the home government/university; foreign private sponsors; the U.S. government; and U.S. private sponsors—provided an average of $6,811 (46.4 percent) in support of foreign graduate students. For undergraduates, the financing from personal and family sources dominates even more dramatically. Of the $12,387 in support reported by undergraduate respondents, an average of $11,155 (approximately 90 percent) came from such sources.

The amount of support reported for each source has been summarized in a different way in the second set of figures in Table 7. As shown there, sources have been combined according to their form—grant or scholarship from any source; loan; work (including assistantships); savings; and family. About one percent of all support was provided as a loan (1.3 percent for graduate students; 1.6 percent for undergraduates). The low proportions indicate that the potential for student loan financing laid out by Woodhall (1987), at least for students from the countries examined in this study, has not been fully exploited. Of course, the figures may understate student use of loan financing to the extent that support provided by parents or other relatives may be repaid (a so-called "informal" loan). While hardly any graduate students or undergraduates depended on loans, work (including assistantships) was used by about one-third of all graduate student respondents to meet college/university expenses, and support from this source (averaging $2,162) accounted for an estimated 14.7 percent of all support.

As shown in Table 6, better than half of the earnings reported from work ($1,314) came from U.S. colleges and universities in the form of assistantships. Another $828, on average, was reported as salary payments from the students' employers in their home countries. For undergraduates, current employment provided a very small share of total support for college expenses.

As reported by foreign students in the survey, less than half of their

support, on average, is derived from sources within the U.S. The proportion is significantly lower for undergraduates than graduates (18.5 percent versus 35.1 percent). Much of the difference by academic level may be explained by U.S. university policies which lead to greater sums allocated to graduate as opposed to undergraduate foreign students.

Unlike most domestic students, those coming to the U.S. from developing countries appear to be financed through a single source. At the graduate level, for example, respondents reporting support from the U.S. government received, on average, $14,793 from U.S. sources—an amount approximately equal to the overall average of $14,690. This reflects the aforementioned tendency of U.S. agencies to fully fund educational costs for participants, rather than to leverage financial assistance through support "packages." The higher amount also could reflect less price sensitivity by participants who know their full costs will be covered regardless of the educational and maintenance charges at the institution they select.

Graduate students with support from their home government/university or from a foreign private sponsor reported average awards of $11,912 and $12,325, respectively. Those drawing on personal and family sources to finance college-related expenses reported an average of $10,194 from these sources. Importantly, nearly two-thirds of all graduate students received support from one of these four identified sources. So few undergraduates utilized sources other than their own savings and support from their families that the extent of "packaging" was necessarily very limited.

Although the extent of support "packages" was limited overall, some sources *were* frequently combined. Patterns of such packages of support are presented in Tables 8 and 9. The figures in the tables indicate the proportions of respondents with support from one source who also received support from another source. As shown in Table 8, 59.5 percent of foreign graduate students receiving support from a U.S. college or university also drew on personal and family sources. In contrast, of those reporting support from any sponsor, 22.6 percent also received support from their families or utilized their own savings. Interestingly enough, foreign graduate students receiving support from a U.S. government-financed source were *least* likely among all sponsored students to draw on other sources.

As shown in Table 9, only 14.6 percent of those with U.S. government support also used support from personal or family sources. Again, this is an indication of a failure of the U.S. - financed programs to exploit other sources of support that the students normally would have used. Thus, the programs are subsidizing family savings as well as the education of the student, at the same time that this practice limits extending the availability of funds to additional potential participants. This raises the possibility that the amounts and award

criteria for U.S. government support could be altered in ways to leverage other sources of support more effectively. The appropriateness of such changes, however, would require more information on the characteristics of the recipients of U.S. government support and the nontraining goals of the support programs. If recipients of U.S. assistance were drawn from target groups who presently are underrepresented because of financial disadvantage, a reduction in sponsor aid may not be offset by increased support from family or other sources and, thus, the likelihood that these students will enroll in designated fields of study would be reduced. However, it should be noted that few participants in these programs are selected on need-based criteria; rather, their selection tends to reflect judgements concerned with manpower development needs.

Financing for Students Given their Employment and Demographic Characteristics

Students with different employment-related characteristics and backgrounds differed markedly in the ways in which they financed their college expenses. As shown in Table 10, prior occupations and post-school plans for graduate students both display strong associations with reported sources of financing.

With respect to post-schooling plans, graduate students intending to find work in a country other than their home country were least likely to be sponsored (16.7 percent received support from a sponsor), and for a clear majority (62.1 percent) college-financed support provided at least half of the total support reported. Respondents previously employed in a university setting as faculty members or research assistants were among those most likely to be sponsored (84.0 percent and 83.3 percent, respectively), as were high level civil servants (such as agency heads, researchers, and officials). At the other extreme, those employed in relatively lower level private sector jobs (e.g., sales and other service jobs) were least likely to be sponsored and most likely to be supported through personal family sources. This supports the assumption that full funding by government sponsors is not likely to be an indication of participant need but must serve other development or bureaucratic needs. At the extreme, foreign training can be viewed as a perquisite of, rather than a prerequisite for, senior civil service status.

Foreign graduate students with no employment experience were not likely to be sponsored (32.2 percent received support from a sponsor), a finding which suggests the importance of prior employment for access to sponsorship and financing for study in the U.S. On the other hand, these graduate students were among those most likely to have financed their college expenses primarily with support from a U.S. college or university (18.3 percent of them did so).

Older students were also among those more likely to be sponsored, with

nearly two-thirds (63.7 percent) of graduate students 36 years of age and older reporting support from a sponsor that amounted to more than half of all support they received. Of 23 to 25 year olds, less than one-fifth (17.5 percent) supported themselves primarily through sponsors' support. The general pattern is provocative. It may be that older students, by virtue of their prior work experience or other qualifications, are simply preferred by (and available to) sponsors. Or, these students may have had better access to information on study and finance opportunities than did younger students (perhaps even having bureaucratic ability to exert direct influence on the choice of recipients). Alternatively, it may be that the benefits of graduate study relative to the costs are too constrained to encourage older potential foreign students to draw upon personal or family resources to finance their studies in the same manner as younger students do. The implications of the observed pattern for public and donor policies will differ according to which explanation is judged to be most applicable (and whether other behavioral explanations can be identified).

Graduate students from groups generally identified as presently underrepresented and/or disadvantaged were less likely to receive support from sponsors. Females were less likely to be sponsored than males. Some 46.7 percent of female respondents received support from a sponsor and, for 38.3 percent, such support accounted for more than half of the total support reported. Interestingly, females were just as likely as males to report support from a U.S. college or university as their primary source of support (13.0 percent versus 13.5 percent). In the latter instance, some of these females may have accompanied their husbands to the U.S. and, subsequently, entered a degree program and received support. Those from towns or cities were more likely to be sponsored than those from rural areas. Specifically, 61.7 percent of foreign graduate students coming originally from towns reported some support from sponsors, compared to a 37 percent share with sponsor support for those with rural backgrounds. Indeed, for students with rural backgrounds, it appears that U.S. colleges and universities have played an important role in financing their study abroad. An estimated 29.6 percent of those originally from rural areas reported support from a U.S. college as their *primary* source of support. This share is substantially higher than reported for any other group.

Foreign graduate students from relatively advantaged families, in terms of the occupational or educational attainments of their fathers, were apparently only slightly less likely to have received support from a sponsor. Some 55.3 percent of respondents whose fathers held high level civil service jobs were supported by a sponsor, in comparison with respondents whose fathers held other, lower level posts, 61.8 percent of whom received such support. Interestingly, those with fathers in high level private sector posts were among the least likely to receive sponsor funding (38.0 percent reported support). One interpretation of this pattern is that access to support from a sponsor is facilitated through arrangements and information available within the civil service. Foreign gradu-

ate students without such connections are simply less likely to obtain sponsor support. The major conclusion to be derived is that however efficacious the U.S. government support programs are for manpower development, they do not appear to be a major equalizing force in remediating current patterns of under-representation of socio-economic disadvantage.

Finally, differences in the patterns of support exist among the individual countries of origin. Brazilians and Indonesians were most likely to be sponsored (72.3 percent and 64.1 percent, respectively) while Jamaicans and Nigerians were least likely to have received support from a sponsor (27.3 percent and 26.4 percent). Given the relatively small proportions of foreign undergraduate students reporting support from a sponsor, the patterns of financing generally appear to be quite similar across employment and demographic characteristics. The detailed distributions are presented in the second half of Table 10.

Table 1
Characteristics of Sample Institutions

	Sample		U.S. (four-year only)	
	Number	Percent	Number	Percent
Control*				
Public	14	70.0%	109	64.0%
Private	6	30.0	62	36.0
Geographic Region				
New England and Northeast	5	5.0%	—	30.9%
Midwest	7	35.0	—	24.4
South and Southwest	5	25.0	—	26.4
West	3	15.0	—	18.1
Enrollment				
Total	496,203		7,800,000	
Foreign Students	36,650		307,007	
as % of total	7.4%		3.9%	

* U.S. distribution of doctoral research universities.

Sources: The Present Survey; *Open Doors, 1986-87*; Center for Education Statistics, *Digest of Education Statistics*, 1988, Tables 148, 163.

Table 2
Survey Response by Country of Origin and Academic Level

	Total	Graduate*	Undergraduate
Total			
Sent	3,428	1,578	1,850
Returned	868	568	300
Rate	25.3%	36.0%	20.5%
Brazil			
Sent	357	274	83
Returned	165	148	17
Rate	46.2%	54.0%	16.2%
Egypt			
Sent	334	284	50
Returned	52	49	3
Rate	15.6%	17.2%	6.0%
Indonesia			
Sent	1,039	267	772
Returned	342	177	165
Rate	32.9%	66.3%	21.4%
Jamaica			
Sent	488	156	332
Returned	90	36	54
Rate	18.4%	23.1%	21.4%
Nigeria			
Sent	1,210	597	613
Returned	219	158	61
Rate	18.1%	26.5%	10.0%

*Includes nondegree students. Excludes sample respondents who fell outside the study frame.

Table 3
Achieved and Analysis Samples

	Achieved Sample	Analysis Sample	Percent
Total	**868**	**805**	**92.7%**
Graduate	548	509	92.8
Undergraduate	300	279	93.0
Other	20	17	85.0

Table 4
Characteristics of Sample Respondents

	U.S (four-year only)	Sample Graduate	Sample Undergraduate
Gender			
Male	69.9%	76.5%	65.5%
Female	30.1	23.5	34.5
Marital/Dependency Status[a]			
None	79.7%	42.4%	89.6%
Any	20.3	57.6	10.4
Age			
22 years and under	n.a.	6.1%	50.6%
23 to 25 years	—	12.6	15.7
26 to 35 years	—	54.6	30.3
36 years and over	—	26.6	3.4
Geographic Origin			
Rural	n.a.	5.3%	3.2%
Town	—	11.7	10.4
City	—	51.4	39.9
Capital City	—	31.4	46.0
Father's Occupation			
University Faculty Research	n.a.	2.8%	1.1%
High Level Civil Servant	—	20.6	9.3
Teacher	—	1.6	.0
High Level Private Sector	—	32.0	53.8
Other	—	33.4	30.5
Not in Labor Force, Unspec.	—	9.6	5.4
Father's Education			
Elementary	n.a.	22.9%	19.7%
Secondary	—	22.0	30.8
High Level Vocational	—	10.6	16.5
Higher Education	—	36.2	31.2
Unspecified	—	1.4	1.8
Prior Occupation			
University Faculty	n.a.	15.9%	.4%
Research Assistant	—	5.9	—
High Level Civil Servant	—	11.8	2.9
Teacher	—	3.9	1.1
High Level Private Sector	—	16.7	7.5
Other	—	3.0	5.4
Not in Labor Force, Unspec.	—	42.6	82.8
Field of Study[b]			
Agriculture	2.4%	15.2%	2.8%
Business	20.3	16.8	26.6
Education	4.0	10.0	2.1
Engineering	23.8	15.4	28.4
Sci., Math. & Comp. Sci.	20.2	14.5	17.3
Soc. Sci. & Humanities	—	12.6	9.0
Pub. Ad. & Law	18.1	6.0	4.2
Health	4.4	4.9	4.2
Other, Unspec.	.68	4.5	5.5

[a] U.S. distribution refers to marital status only.
[b] U.S. distribution adjusted to exclude IELP enrollments.

Sources: Institute of International Education/USAID Student Survey, 1987.
Institute of International Education, *Open Doors, 1986-87*; Present Survey.

Table 5
Trends in Sources of Support for Foreign Students

Primary Source	1980-81	1982-83	1984-85	1986-87
Sponsor	19.7%	19.6%	14.6%	17.2%
Home Government/University	(12.9)	(12.8)	(6.6)	(10.0)
Foreign Private Sponsor	(2.8)	(2.8)	(2.3)	(5.6)
U.S. Government	(2.3)	(2.2)	(2.7)	(1.6)
U.S. Private Sponsor	(1.7)	(1.8)	(2.0)	(2.7)
Personal and Family	67.4%	67.8%	63.2%	64.3%
U.S. College or University	8.6	8.9	10.1	15.1
Current Employment	2.3	2.4	1.7	2.5
Other	2.0	1.3	.4	.9

Sources: Institute of International Education, *Open Doors*, various years.

Table 6

Detailed Sources of Support for Foreign Students by Level: 1986-87

Graduate (n = 509)

Sources of Support	Percent Using Source	Average for Those Using Source	Overall Average	Percent of Total Support*
Total	**100.0%**	**$14,690**	**$14,690**	**100.0%**
Personal and Family	**50.5%**	**$10,194**	**$ 5,147**	**35.0%**
Savings	35.8	9,324	3,334	22.7
Spouse	17.1	6,811	1,164	7.9
Relatives	11.2	4,823	540	3.7
Private Loan	2.8	3,961	109	.7
Home Government/University	**35.4%**	**$11,912**	**$ 4,212**	**28.7%**
Grant or Scholarship	35.0	11,937	4,174	28.4
Loan	.8	4,825	38	.2
U.S. College or University	**30.0%**	**$ 6,269**	**$ 1,884**	**12.8%**
Grant or Scholarship	10.4	4,884	509	3.5
Assistantship	20.8	6,312	1,314	8.9
State Grant	1.2	5,183	61	.4
Foreign Private Sponsor	**6.7%**	**$12,325**	**$ 823**	**5.6%**
Employer Grant	6.1	12,518	762	5.2
Employer Loan	.2	20,000	39	.3
Other	.4	5,500	22	.1
U.S. Government	**8.0%**	**$14,793**	**$ 1,192**	**8.1%**
via U.S. Agency	1.8	12,079	214	1.4
via Home Country Government	6.3	15,557	978	6.6
Current Employment	**13.8%**	**$ 6,160**	**$ 847**	**5.8%**
in U.S.	.2	9,500	19	.1
in Home Country	13.6	6,112	828	5.6
U.S. Private Sponsor	**5.9%**	**$ 9,908**	**$ 583**	**4.0%**

*Computed as ratio of overall averages.

Table 6 *(continued)*
Detailed Sources of Support for Foreign Students by Level: 1986-87

Undergraduate (n = 279)

Sources of Support	Percent Using Source	Average for Those Using Source	Overall Average	Percent of Total Support*
Total	**100.0%**	**$12,387**	**$12,387**	**100.0%**
Personal and Family	**92.4%**	**$12,063**	**$11,155**	**90.0%**
Savings	79.9	12,037	9,621	77.7
Spouse	8.2	6,161	508	4.1
Relatives	15.8	5,370	847	6.8
Private Loan	5.7	3,128	179	1.4
Home Government/University	**4.6%**	**$10,130**	**$ 472**	**3.8%**
Grant or Scholarship	4.3	10,474	450	3.6
Loan	.4	6,000	22	.2
U.S. College or University	**10.4%**	**$ 3,854**	**$ 401**	**3.2%**
Grant or Scholarship	8.6	3,853	331	2.7
Assistantship	1.1	5,267	57	.5
State Grant	1.4	875	12	.1
Foreign Private Sponsor	**.4%**	**$ 8,000**	**$ 29**	**.2%**
Employer Grant	.4	8,000	29	.2
Employer Loan	.0	0	0	.0
Other	.0	0	0	.0
U.S. Government	**2.5%**	**$ 2,373**	**$ 60**	**.5%**
via U.S. Agency	2.2	1,768	38	.3
via Home Country Government	.4	6,000	22	.2
Current Employment	**2.9%**	**$ 4,915**	**$ 141**	**1.1%**
in U.S.	.4	10,000	36	.3
in Home Country	2.5	4,188	105	.8
U.S. Private Sponsor	**1.8%**	**$ 7,247**	**$ 130**	**1.0%**

*Computed as ratio of overall averages.

Table 7
Composition of Support for Foreign Students by Level: 1986-87

	Percent Using Source	Average for Those Using Source	Overall Average	Percent of Total Support*
Graduate (n = 509)				
Total	**100.0%**	**$14,690**	**$14,690**	**100.0%**
I. Source				
Sponsor	53.0%	$12,840	$ 6,811	46.4%
U.S. College or University	30.0	6,268	1,884	12.8
Personal and Family	50.5	10,194	5,147	35.0
Current Employment	13.8	6,160	847	5.8
II. Form				
Grant or Scholarship	60.9%	$11,992	$ 7,304	49.7%
Loan	3.7	4,987	186	1.3
Work	33.0	6,549	2,162	14.7
Savings	35.8	9,324	3,334	22.7
Family	25.5	6,673	1,704	11.6
III. Origin of Funds				
U.S. Source	54.6%	$ 9,442	$ 5,157	35.1%
Non-U.S. Source	73.5	12,974	9,533	64.9
Undergraduate (n = 279)				
Total	**100.0%**	**$12,387**	**$12,387**	**100.0%**
I. Source				
Sponsor	9.3%	$ 7,405	$ 690	5.6%
U.S. College or University	10.4	3,854	401	3.2
Personal and Family	92.5	12,063	11,155	90.0
Current Employment	2.9	4,915	141	1.1
II. Form				
Grant or Scholarship	17.9%	$ 5,650	$ 1,012	8.2%
Loan	6.1	3,297	201	1.6
Work	3.9	5,011	198	1.6
Savings	79.9	12,037	9,621	77.7
Family	22.2	6,097	1,355	10.9
III. Origin of Funds				
U.S. Source	37.3%	$ 6,152	$ 2,293	18.5%
Non-U.S. Source	81.4	12,406	10,094	81.5

* Computed as ratio of overall average.

Table 8

Packages of Support for Foreign Students by Academic Level: 1986-87

	Percent receiving support from:			
	Sponsor (n = 270)	U.S. College (n = 153)	Personal and Family (n = 257)	Current Employment (n = 70)
Graduate				
who were also receiving support from:				
Sponsor	—	28.1%	23.7%	80.0%
U.S. College or University	15.9%	—	35.4	17.1
Personal and Family	22.6	59.5	—	22.2
Current Employment	20.7	7.8	6.0	—

	Percent receiving support from:			
	Sponsor (n = 26)	U.S. College (n = 29)	Personal and Family (n = 258)	Current Employment (n = 8)
Undergraduate				
who were also receiving support from:				
Sponsor	—	6.9%	4.6%	50.0%
U.S. College or University	7.7%	—	8.5	12.5
Personal and Family	46.2	75.9	—	75.0
Current Employment	15.4	3.4	2.2	—

Source: IIE/USAID Student Survey, 1987.

Table 9

Packaging with Support from Sponsors by Academic Level: 1986-87

	Percent receiving support from:			
	Home Government/ University (n = 180)	Foreign Private Sponsor (n = 34)	U.S. Government (n = 41)	U.S. Private Sponsor (n = 30)
Graduate				
who were also receiving support from:				
Personal and Family	20.6%	44.1%	14.6%	20.0%
Home Government or University	—	8.8	.4	30.0
U.S. College or University	16.1	26.5	2.4	20.0
Foreign Private Sponsor	1.7	—	2.4	.0
U.S. Government	1.1	2.9	—	.0
Current Employment	23.9	20.6	9.8	16.7
U.S. Private Sponsor	5.0	.0	.0	—

	Percent receiving support from:			
	Home Government/ University (n = 13)	Foreign Private Sponsor (n = 1)	U.S. Government (n = 7)	U.S. Private Sponsor (n = 5)
Undergraduate				
who were also receiving support from:				
Personal and Family	23.1%	100.0%	85.7%	40.0%
Home Government or University	—	.0	.0	.0
U.S. College or University	.0	.0	14.3	20.0
Foreign Private Sponsor	.0	—	.0	.0
U.S. Government	.0	.0	—	.0
Current Employment	15.4	.0	14.3	20.0
U.S. Private Sponsor	.0	.0	.0	—

Table 10

Financing of Foreign Students by Student Characteristic and Level: 1986-87

Graduate

	Sponsorship			Primary Source of Support			
	(n)	Spon-sored	Non-sponsored	Sponsor	U.S. College	Personal & Family	Current Employ-ment
Total	**(509)**	**53.0%**	**47.0%**	**48.4%**	**13.6%**	**35.6%**	**2.4%**
Prior Occupation							
Univ. Faculty	(81)	84.0%	16.0%	80.0%	8.8%	10.0%	1.2%
Research Asst.	(30)	83.3	16.7	83.3	13.3	3.3	.0
Teacher	(20)	40.0	60.0	30.0	25.0	40.0	5.0
High Level Civ. Ser.	(60)	83.3	16.7	81.4	1.7	15.2	1.7
High Level Private	(85)	51.8	48.2	46.4	13.1	35.7	4.8
Other	(16)	50.0	50.0	50.0	.0	50.0	.0
Not in LF	(216)	32.2	67.7	27.2	18.3	53.0	1.4
Post-School Plans							
Further Study	(18)	50.0%	50.0%	41.2%	17.6%	41.2%	.0%
Work in Home Cntry.	(412)	60.4	39.6	2.5	30.0	11.4	56.2
Work in Other Cntry.	(66)	16.7	83.3	3.0	62.1	22.7	12.1
Age							
22 years or under	(31)	19.4%	80.6%	12.9%	9.7%	77.4%	.0%
23 to 25 years	(64)	23.4	76.6	17.5	15.9	66.7	.0
26 to 35 years	(278)	55.8	44.2	52.0	15.1	30.0	3.0
36 years and over	(136)	69.1	30.9	63.7	10.4	23.0	3.0
Gender							
Male	(388)	55.2%	44.8%	51.6%	13.5%	32.3%	2.6%
Female	(120)	46.7	53.3	38.3	13.0	47.0	1.7
Dependents							
None	(217)	35.5%	64.5%	31.9%	15.7%	50.0%	2.4%
Any	(292)	66.1	33.9	60.3	12.1	25.2	2.4
Geographic Origin							
Rural	(27)	37.0%	63.0%	33.3%	29.6%	37.0%	.0%
Town	(60)	61.7	38.3	54.2	10.2	30.5	5.1
City	(262)	59.5	40.5	55.6	14.4	28.0	2.0
Capital	(159)	41.5	58.5	36.5	10.9	50.0	2.6
Father's Occupation							
University Fa. Res.	(14)	64.3%	35.7%	64.3%	7.1%	28.6%	.0%
High Lev. Civ. Serv.	(105)	53.3	46.7	48.0	15.7	35.3	1.0
Teacher	(8)	87.5	12.5	87.5	.0	12.5	.0
High Level Priv.	(163)	38.0	62.0	34.6	16.4	47.8	1.3
Other	(170)	61.8	38.2	55.0	13.6	27.8	3.6
Not in LF, Unspec.	(49)	63.3	36.7	60.4	4.2	29.2	6.2
Father's Education							
Elementary	(152)	59.2%	40.8%	53.6%	13.2%	28.5%	4.6%
Secondary	(112)	57.1	42.9	55.4	13.6	28.2	2.7
High Level Voc.	(54)	50.0	50.0	48.2	13.0	38.9	.0
Higher Ed.	(184)	46.7	53.3	40.4	14.0	44.4	1.1
Unspec.	(7)	42.9	57.1	28.6	14.3	57.1	.0
Country							
Brazil	(130)	72.3%	37.7%	65.4%	15.8%	15.8%	3.2%
Egypt	(39)	59.0	41.0	53.8	15.4	28.2	2.6
Indonesia	(167)	64.1	35.9	63.0	5.4	30.9	.6
Jamaica	(33)	27.3	72.7	18.2	18.2	63.6	.0
Nigeria	(140)	26.4	73.6	20.6	20.0	55.2	4.4

Source: IIE/USAID Student Survey, 1987.

Table 10 (*continued*)
Financing of Foreign Students by Student Characteristic and Level: 1986-87

Undergraduate

		Sponsorship		Primary Source of Support			
	(n)	Spon-sored	Non-sponsored	Sponsor	U.S. College	Personal & Family	Current Employ-ment
Total	**279**	**9.3%**	**90.7%**	**6.1%**	**4.0%**	**88.4%**	**1.4%**
Prior Occupation							
Univ. Faculty	(1)	100.0%	.0%	100.0%	.0%	.0%	.0%
Research Asst.	—	—	—	—	—	—	—
High Civil Service	(8)	25.0	75.0	12.5	.0	87.5	.0
Teacher	(3)	66.7	33.3	33.3	.0	33.3	33.3
High Private Sector	(21)	19.0	81.0	14.3	4.8	76.2	4.8
Other	(15)	13.3	86.7	.0	.0	92.9	—
Not in LF	(231)	6.5	93.5	4.8	4.4	90.4	.4
Post-School Plans							
Further Study	(24)	4.2%	95.8%	4.2%	16.7%	79.2%	.0%
Work in Home Cntry.	(156)	13.5	86.5	9.7	.0	88.4	1.9
Work in Other Cntry.	(83)	2.4	97.6	1.2	7.2	90.4	1.2
Age							
22 years or under	(91)	3.3%	96.7%	3.3%	7.7%	89.0%	.0%
23 to 25 years	(128)	7.0	93.0	4.7	2.4	92.9	.0
26 to 35 years	(54)	20.4	79.6	11.3	1.9	79.2	7.6
36 years and over	(6)	50.0	50.0	33.3	.0	66.7	.0
Gender							
Male	(182)	11.5%	88.5%	7.7%	3.3%	87.3%	1.7%
Female	(97)	5.2	94.8	3.1	5.2	90.6	1.0
Dependents							
None	(250)	6.8%	93.2%	4.8%	4.0%	89.9%	1.2%
Any	(29)	31.0	69.0	17.2	3.4	75.9	3.4
Geographic Origin							
Rural	(9)	33.3%	66.7%	11.1%	33.3%	44.4%	11.1%
Town	(29)	17.2	82.8	13.8	6.9	79.3	.0
City	(111)	9.0	91.0	6.3	2.7	90.1	.9
Capital	(129)	6.2	93.8	3.9	2.4	92.1	1.6
Father's Occupation							
University Fa. Res.	(13)	66.7%	33.3%	66.7%	.0%	33.0%	.0%
High Lev. Civ. Serv.	(26)	15.4	84.6	11.5	7.7	80.8	.0
Teacher	(0)	—	—	—	—	—	—
High Level Priv.	(150)	3.3	96.7	2.7	2.7	94.0	.7
Other	(85)	13.0	87.0	9.4	3.5	85.9	1.2
Not in LF, Unspec.	(15)	26.7	73.3	.0	14.3	71.4	14.3
Father's Education							
Elementary	(55)	18.2%	81.8%	9.3%	3.7%	81.5%	5.6%
Secondary	(86)	3.5	96.5	3.5	4.6	90.7	1.2
High Level Voc.	(46)	10.9	89.1	6.5	4.4	89.1	.0
Higher Ed.	(87)	8.0	92.0	6.9	2.3	90.8	.0
Unspec.	(5)	20.0	80.0	.0	25.0	75.0	.0
Country							
Brazil	(17)	17.6%	82.4%	11.8%	5.9%	82.4%	.0%
Egypt	(2)	.0	100.0	.0	.0	100.0	.0
Indonesia	(160)	3.8	96.2	3.8	.0	96.2	.0
Jamaica	(48)	12.5	87.5	6.4	19.2	70.2	4.3
Nigeria	(51)	21.6	78.4	12.0	2.0	82.0	4.0

Source: IIE/USAID Student Survey, 1987.

2. Field of Study Choices

How do the financing patterns just described relate to field of study choices of foreign students? The questionnaire elicited several pieces of information on student field of study choices. First, the students indicated in responses to three open-ended questions the field in which they enrolled. By reference to catalogs from the appropriate university, the responses were coded as one of ninety-two separate field of study categories. As shown in Chart 2, the detailed field of study classifications have been aggregated into nine summary categories for the tabulations. The aggregation was based partly on a presumed policy interest on the part of sponsoring agencies in certain fields and partly on the numbers of respondents in identified fields (or groups of fields). A separate question asked students to indicate whether their current field was the preferred one, and if not, which field they would have preferred to enter.

Field of Study Choices

Table 11 presents the percentage distribution of respondents by field of study for each academic level. As shown there, relatively large proportions of foreign graduate students enrolled in agriculture (15.3 percent), business (16.5 percent), engineering (15.9 percent), and the natural sciences (14.3 percent). Respondents were relatively less likely to have enrolled in education (9.6 percent), the social sciences (12.4 percent), public administration (6.3 percent), and health (4.7 percent). Enrollments of foreign undergraduate student respondents tended to be concentrated in business (26.5 percent), engineering (28.7 percent), and the natural sciences (17.9 percent). These patterns correspond with those previously reported in U.S. Department of Education and IIE surveys of foreign student enrollments by field, although they differ in detail due to the nature of the sample used in this study (as indicated in Table 4).

Chart 2. Classification of Fields of Study

Major Field	Subsidiary Field of Study
Agriculture	
Business	
Education	
Engineering	
Science & Math	Physical Sciences Biology Mathematics Computer Science
Soc. Sci. & Humanities	Liberal Arts Philosophy Political Science
Public Ad.& Law	Public Administration Law Communications Law Enforcement
Health	Health
Other	Architecture Home Economics

Most foreign students indicated that they were enrolled in their preferred field (87.4 percent at the graduate level; 83.2 percent at the undergraduate level). Across fields, foreign graduate students in business and management programs and in education were least likely to be enrolled in a first choice field (79.8 percent and 81.6 percent, respectively). Alternatively, all of the foreign graduate students enrolled in health professions training programs indicated the field was their first choice. Among undergraduates, education and social sciences majors were least likely to be in their preferred fields (50.0 percent and 72.0 percent, respectively). Foreign undergraduates in public administration, health, and agriculture were more likely to have enrolled in a first choice field. Student-reported preferences should be taken as indicative only, since students may have responded that they "preferred" their present fields because they were admitted to them or had received support to enroll in them. It is not possible to ascertain, for example, how students might have responded if they were asked to indicate a preference "assuming you could be admitted and would receive support sufficient to cover your expenses." Future studies might explore the utility of such a questionnaire item.

Table 12 indicates the preferred choices of foreign students enrolled in a second choice, rather than preferred field of study. As shown there, relatively

large proportions of those in second choice fields are currently enrolled in a program within the same broad classification. At the graduate level, for example, 29.2 percent of those enrolled in a second choice program in business indicated that their first choice program was also in business. However, there are also some instances of students enrolling in fields quite different from their preferred ones. Again, of those currently in a business program identified as their second choice, 29.2 percent preferred a program in the natural sciences or mathematics. And, of those enrolled in the natural sciences as a second choice, nearly two-fifths (38.5 percent) listed a health-related field as their first choice. Assuming these students could have successfully completed programs in the health professions, the pattern raises the prospect of a difficult trade-off for sponsors: those potentially encouraged to enroll in one targeted field due to financing may be drawn from another targeted field.

The sources used to finance foreign students clearly differed across fields of study. The patterns are displayed in Table 13. For graduate students in an identified field, those in agriculture were most likely, while those in business programs were least likely, to have received support from a sponsor (69.2 percent versus 40.5 percent). In general, students in agriculture, education, and engineering were most likely to have financed college expenses primarily through sponsor support. At the other extreme, foreign graduate students enrolled in business programs were most likely to have supported themselves primarily through personal and family sources of financing (53.0 percent did so, compared to a 35.6 percent share overall). Fewer than one-third of those enrolled in fields they described as not preferred received support from a sponsor. It is very interesting to note that support from a sponsor was not the predominant incentive that led students to be drawn away from their first choice fields or "forced" them into less preferred fields. On the other hand, the need to rely on personal and family sources of support may have led these students to enroll in fields with more promising personal rewards rather than fields which would develop competencies perceived to be more important in serving national development needs. Finally, foreign graduate students enrolled in engineering, as well as those in the natural sciences and social sciences, were most likely to have supported themselves primarily through U.S. college/university-financed support (including teaching and research assistantships). The shares reporting such support were 17.5 percent, 22.2 percent, and 22.6 percent, respectively (compared to a 13.6 percent share overall). In part, this is a manifestation of the available supply of financial assistance in these institutions.

Field of Study Choices, Financing, and Student Plans and Characteristics

Do field of study choices differ when employment-related characteristics, student background (e.g., gender, geographic origin, and parents' occupation), and sources of support are taken into account? The following analyses will

attempt to provide some initial answers. Since so few undergraduates received support from a sponsor (or from any non-family source), the data displayed and discussed refer to foreign graduate students only.

Field of Study and Employment Plans

The extent to which sponsored graduate students planned to work in their home countries after completing their studies is noticeably higher than the corresponding rate for nonsponsored students. The only field of study in which less than 90 percent of sponsored students planned to return home is science and math, with 67.9 percent, planning to return and 15.4 declaring their intention to work in another country (Table 14). Among nonsponsored graduate students, there was more variation related to field of study: students in agriculture (79.2 percent) and in education (94.7 percent) were most likely to plan to return to their home countries following graduation, while those in engineering (61.8 percent) and in the natural sciences (60.0 percent) were among the least likely (Table 14). However, significant proportions of nonsponsored graduate students in every field planned to return home, including the several fields normally favored by development-oriented sponsors. By contrast, if the sponsors' support was intended to help the home country develop a pool of manpower highly trained in the natural sciences and math, then the relatively high proportion of sponsored students electing to work elsewhere following graduation represent a loss to the sending country. It is worth noting, however, that the proportion is not actually large and that the potential loss would appear to be quite small.

Post-school plans and a number of other characteristics of respondents in each field may be distributed also according to two primary sources of support—sponsor and personal and family. This analysis reveals patterns that largely duplicate those just discussed.

Field of Study and Prior Occupation

The fields of study of sponsored and nonsponsored graduate students differed according to prior occupation as well. As shown in Table 15, relatively large proportions of sponsored graduate students in engineering (33.3 percent), the natural sciences (33.3 percent), the social sciences (31.2 percent), and health fields (41.7 percent) held faculty posts prior to taking up their studies in the United States. Sponsored graduate students in business and public administration were relatively more likely to have held high level posts in the civil service (26.5 percent and 38.9 percent, respectively) and in the private sector (26.5 percent and 16.7 percent,) before beginning graduate studies. The pattern likely reflects the operation of selection criteria imposed by the sponsors. In engineering and sciences, graduate study by faculty is sponsored as part of a strategy to upgrade academic and research programs in home country institutions of higher education. Most of these students are expected to return to their

academic posts upon completion of their studies. In business and public administration, sponsors are probably selecting students to meet quite specific manpower needs. In the latter case, sponsor support appears to be influencing student field of study choices. Note, in particular, that a relatively high 26.3 percent of those who are in a less preferred field of study came from high level civil service posts (compared to 18.5 percent of all graduate students who held such posts prior to undertaking graduate studies).

Nonsponsored graduate students in business and public administration were relatively more likely to have held high level posts in the private sector (32.0 percent and 35.7 percent), but most nonsponsored students were not working prior to beginning their studies. The general implication is that information about sponsor support and sponsors' selection criteria simply do not reach outside of key, identified occupations and posts.

Sources of financing do appear to have a differential association with field of study choices across age groups. There is some indication, for example, that younger graduate students chose to enroll in engineering and the natural sciences without the incentives implicit in support provided through sponsors. As shown in Table 16, of nonsponsored graduate students in engineering and the natural sciences, 41.7 percent and 52.9 percent, respectively, are 25 years old or under. Sponsored students generally, and those in engineering and the natural sciences in particular, were more likely to be older. Nearly two-thirds of the sponsored respondents in both fields were 26 to 35 years old (68.9 percent and 64.5 percent). For graduate students in agricultural programs the distributions by age for groups with quite different financing sources are more nearly equal.

The general implication is that the associations between sources of financing and field of study choices differ across age groups. Younger students, anticipating financial rewards from post-school employment in science and engineering occupations, may be willing to enroll in these fields without sponsor support. They appear to be relatively *less* willing to enroll in the less remunerative education and public administration fields without such support. If the patterns observed here are, indeed, reflective of the effects of financing, then sponsors will find their present forms of support have the greatest marginal influence when targeted on older eligible foreign graduate students generally, and particularly those in engineering, the natural sciences, and health programs. For younger students, sponsors might search for ways to "leverage" support that would be provided by families, employers, and U.S. universities.

These observations become even clearer when other characteristics of graduate students by age group are examined (Table 17). Most particularly, younger graduate students were less likely to have any prior work experience (77.4 percent of those under 22 years of age and 78.1 percent of 23 to 25 year

olds, respectively), and more likely to expect to work outside of their home countries (44.8 percent of 22 and under and and 26.2 percent of 23 to 25 year olds, respectively). These patterns suggest that sponsors might first consider whether a relaxation of selection criteria based on prior employment might be warranted to draw younger candidates from underrepresented populations. A second implication, as mentioned, is the potential scope for providing partial support to privately financed younger graduate students in return for a commitment to return to the home country following graduation.

Student Background

Sponsors can use their support to enable previously underrepresented student populations to participate in study abroad, at the same time as promoting training in fields which develop skills judged most important for national needs. The underrepresented populations include females, students from rural areas, and students whose parents hold low paying and low status jobs. The extent to which sponsor support alters the incidence of the representation in particular fields of students with these characteristics is a potential social benefit of the student subsidization programs.

Females accounted for relatively large shares of nonsponsored graduate students in education, the social sciences, and health programs (42.1 percent, 35.5 percent, and 41.7 percent, respectively). Among sponsored graduate students, females represented relatively large proportions only in the natural sciences, where one-third of all those sponsored were female (Table 18). In contrast, the proportion of females among sponsored students in engineering is quite small (6.7 percent), and relatively small (25 percent) in the health fields.

The patterns of gender participation suggest very different effects by field. In some fields (education, health, social sciences) females comprise relatively large shares of enrollments among those without support. The proportions are large enough to suggest that additional financial support intended to encourage females to enter these fields may not be a priority issue. In the natural sciences, the availability of sponsor financing appears to be associated with relatively greater enrollments of females. Finally, in the fields of engineering and agriculture, the enrollments of females are so low as to suggest that, while financial support may have had some effect, award criteria and/or selection bias may have limited the access of females to such support. Thus, the use of targeted support to encourage relatively greater female enrollments may not, by itself, be sufficient to overcome sex-role identification or other constraints on female participation. A major finding in these data is that the sponsored students are *less* likely to be from this particular underrepresented group than are nonsponsored students. Thus, providing aid to nonsponsored students may promote the equity concerns that are at least a nominal goal of some sponsors.

Within certain fields, graduate students with dependents apparently

relied more heavily on support from sponsors than did those without dependents. Among nonsponsored graduate students in engineering and health programs, for example, less than half (38.9 percent and 16.7 percent, respectively) were married or had dependents (Table 19). In these fields, support from a sponsor appears to be associated with substantially greater participation by graduates with dependents. In both fields, about 80 percent of the respondents were married or had dependents. One possible interpretation of this pattern is that foreign graduate students with dependents cannot afford to enroll in U.S. higher education without substantial support (principally from a sponsor), and that such support is quite effective in encouraging them to enroll in targeted fields. A corollary explanation is that some sponsors provide support for dependents as part of their funding package. When this is the case, the sponsored student with dependents has a dramatic financial advantage over the nonsponsored student with similar familial obligations. The availability of such support packages may well encourage able but poor students with dependents to obtain overseas training.

In allocating support for foreign study in the United States, sponsors may aim to assist those students who are otherwise less likely to obtain higher education. Individuals from rural areas constitute one such group; relatively small proportions enroll in college and university programs generally and in the higher cost fields in particular (Yao, 1986; Nnane, 1988). Moreover, the lower-cost fields in which they do enroll tend to have the lowest income prospects. While this general pattern is borne out among respondents in this sample, it does appear that one important effect of support from sponsors may be to reach students outside the capital cities of the home country. In engineering, the sciences, and the health fields, for example, nonsponsored students from the capital cities were in the majority or nearly so. Table 20 shows that their shares of enrollments in these fields reached 52.8 percent, 38.2 percent, and 66.7 percent, respectively. Among sponsored students in the same fields, students from large cities (but not the capital) dominated. Thus, while selection and funding may have widened access within urban areas, there is no indication that support from sponsors has been effectively directed toward students with rural or small town backgrounds.*

In general, sponsors support reached relatively large proportions of students whose fathers were *not* employed in high level professional posts in the civil service or private sector. Among all graduate student respondents receiving support from a sponsor, 38.9 percent had fathers who were employed in lower level posts and 11.5 percent had fathers who were unemployed or not in the labor

*Since most secondary schools in less developed countries are located in urban areas, the question of location should be directed at area of birth or parents' residence rather than the most recent student residence. The survey item asks the respondent to characterize where he or she lived *most of your life*.

force (Table 21). But the pattern of sponsor support for students from these less advantaged backgrounds differed by field of study. Most particularly, sponsored graduate students whose fathers held lower level posts were relatively more likely to be in agriculture (46.3 percent), education (63.3 percent), and the health fields (50.0 percent). In contrast, while 23 percent of all sponsored graduate students had fathers who held high level posts in the private sector, the proportions were larger among graduate students in business (32.4 percent), engineering (33.3 percent), and the social sciences and humanities (37.5 percent).

A similar pattern emerges when field of study choices of sponsored graduate students are arrayed according to the educational attainment of parents, in this case, of the father. As shown in Table 22, sponsored graduate students are relatively more likely than their nonsponsored counterparts to come from families in which the father was schooled at most through elementary level (33.3 percent compared to 25.9 percent). But, again, sponsored graduate students whose fathers had attained only this lowest level of education were more likely to be found in education (50.0 percent), and somewhat more likely in agriculture (42.6 percent), the natural sciences (41.3 percent), and the health fields (41.7 percent).

All of these findings generally imply that sponsor support has not had the effect of bringing those from less advantaged backgrounds into relatively higher cost fields of study and into those fields leading to more remunerative positions upon graduation. Moreover, for relatively large proportions of these students, sponsors' support has encouraged them to enroll in fields that were not "first choice." For example, an estimated 47.7 percent of sponsored graduate students whose fathers held lower level posts in the civil service or private sector were enrolled in a second choice, "not preferred" field (Table 21). This pattern cannot, therefore, be attributed solely to student preferences. Selection criteria and limited access to accurate and timely information about programs and financing likely account for some of the patterns in field of study choices among students with different family backgrounds.

Country Comparisons

Finally, comparisons of field of study choices by sources of financing reveal somewhat different patterns among the selected countries. For Brazilian graduate students, the association appears strong in some fields. Brazilians accounted for 48.7 percent of sponsored students in the natural sciences and 41.7 percent in the health programs. Their shares in these fields among nonsponsored students are 17.6 percent and 25.0 percent, respectively (Table 23). The pattern is different for Indonesians. Among graduate students without support from a sponsor, Indonesians accounted for relatively large proportions of the

enrollments in engineering (36.1 percent) and the natural sciences (47.1 percent). In fields such as business and public administration, the presence of sponsors' support appears to be highly associated with student choices: Indonesians accounted for 58.8 percent of enrollments in business and 66.7 percent in public administration. The latter pattern is provocative, possibly suggesting that opportunities for graduates in these fields in the home country are sufficient to encourage enrollments without support from a sponsor. An equally plausible explanation is that these students may be responding to opportunities outside of their home country (and that they have access to personal and family funds sufficient to support study through the graduate level in the U.S.).

Table 11
Field of Study Choices of Foreign Students by Academic Level: 1986-87

	Graduate (n = 509)			Undergraduate (n = 279)		
	(n)	Current Field	Percent for Whom Field is First Choice	(n)	Current Field	Percent for Whom Field is First Choice
Total	—	**100.0%**	**87.4%**	—	**100.0%**	**83.2%**
Agriculture	(78)	15.3%	93.6%	(8)	2.8%	87.5%
Business	(84)	16.5	79.8	(74)	26.5	83.8
Education	(49)	9.6	81.6	(6)	2.2	50.0
Engineering	(81)	15.9	93.8	(80)	28.7	86.2
Sci., Math, Comp. Sci.	(73)	14.3	86.3	(50)	17.9	86.0
Soc. Sci. & Hum.	(63)	12.4	85.7	(25)	9.0	72.0
Pub. Ad. & Law	(32)	6.3	90.6	(11)	3.9	100.0
Health	(24)	4.7	100.0	(10)	4.2	91.7
Other	(23)	4.5	78.3	(14)	5.0	69.3

Source: IIE/USAID Student Survey, 1987.

Table 12
Preferred Fields of Study for Foreign Students Enrolled in a Second Choice Field: 1986-87

Graduate — Preferred Field
(n = 99)

Current Field	(n)	Ag.	Bus.	Ed.	Eng.	Sci.& Math	Soc. Sci. & Hum.	Pub. Ad.	Health	Oth.
Total	**(99)**	**9.1%**	**14.1%**	**3.0%**	**11.1%**	**13.1%**	**12.1%**	**7.1%**	**14.1%**	**16.2%**
Agriculture	(10)	50.0	.0	.0	10.0	.0	.0	.0	.0	40.0
Business	(22)	4.2	29.2	4.2	.0	29.2	8.3	4.2	8.3	12.5
Education	(10)	.0	20.0	10.0	.0	.0	30.0	.0	10.0	30.0
Engineering	(12)	8.3	16.7	.0	58.3	8.3	.0	8.3	.0	.0
Sci., Math., CS	(13)	.0	.0	.0	7.7	23.1	.0	7.7	38.5	23.1
Soc. Sci. & Hum.	(15)	.0	20.0	6.7	6.7	6.7	40.0	6.7	.0	13.3
Pub. Ad. & Law	(5)	20.0	.0	.0	20.0	.0	20.0	40.0	.0	.0
Health	(6)	.0	.0	.0	.0	.0	.0	.0	100.0	.0
Other	(6)	16.7	.0	.0	.0	16.7	.0	16.7	33.3	16.7

Undergraduate — Preferred Field
(n = 68)

Current Field	(n)	Ag.	Bus.	Ed.	Eng.	Sci.& Math	Soc. Sci. & Hum.	Pub. Ad.	Health	Oth.
Total	**(68)**	**4.4%**	**20.6%**	**1.5%**	**11.8%**	**13.2%**	**7.4%**	**11.8%**	**10.3%**	**19.1%**
Agriculture	(2)	50.0	.0	.0	.0	.0	.0	.0	50.0	.0
Business	(17)	5.9	29.4	5.9	5.9	5.9	11.8	17.6	5.9	11.8
Education	(3)	.0	66.7	.0	33.0	.0	.0	.0	.0	.0
Engineering	(12)	7.1	21.4	.0	7.1	21.4	7.1	.0	.0	35.7
Sci., Math., CS	(11)	.0	18.2	.0	27.3	36.4	.0	.0	9.1	9.1
Soc. Sci. & Hum.	(8)	.0	12.5	.0	12.5	12.5	12.5	25.0	.0	25.0
Pub. Ad. & Law	(5)	.0	.0	.0	.0	.0	.0	100.0	.0	.0
Health	(4)	.0	.0	25.0	.0	.0	.0	.0	75.0	.0
Other	(6)	.0	12.5	.0	.0	.0	12.5	25.0	12.5	12.5

Source: IIE USAID Student Survey, 1987.

Table 13
Financing by Current Field of Study of Foreign Students: 1986-87

		Sponsorship		Primary Source of Support			
	(n)	Spon-sored	Non-Spon-sored	Sponsor	U.S. College	Personal & Family	Current Employ-ment
Graduate							
Total	**(509)**	**53.0%**	**47.0%**	**48.4%**	**13.6%**	**35.6%**	**2.4%**
Current Field							
Agriculture	(78)	69.2%	30.8%	68.8%	10.4%	20.8%	.0%
Business	(84)	40.5	59.5	37.4	6.0	53.0	3.6
Education	(49)	61.2	38.8	55.1	14.3	28.6	2.0
Engineering	(81)	55.6	44.4	51.2	17.5	27.5	3.8
Science & Math	(73)	53.4	46.6	44.4	22.2	31.9	1.4
Soc. Sci. & Hum.	(63)	50.8	49.2	46.8	22.6	29.0	1.6
Pub. Ad. & Law	(32)	56.2	43.8	43.3	3.3	43.3	10.0
Health	(24)	50.0	50.0	47.8	8.7	43.4	.0
Other	(23)	17.4	82.6	13.6	4.6	81.8	.0
Rank							
Preferred	(436)	56.4%	43.6%	52.1%	13.5%	31.6%	2.8%
Not Preferred	(61)	29.7	70.3	23.4	14.1	62.5	.0
Undergraduate							
Total	**(279)**	**9.3%**	**90.7%**	**6.1%**	**4.0%**	**88.4%**	**1.4%**
Current Field							
Agriculture	(8)	12.5%	87.5%	.0%	.0%	100.0%	.0%
Business	(74)	9.5	90.5	8.1	2.7	87.8	1.4
Education	(6)	66.7	33.3	50.0	.0	33.3	16.7
Engineering	(80)	5.0	95.0	3.8	3.8	91.2	1.2
Science & Math	(50)	6.0	94.0	4.0	6.0	90.0	.0
Soc. Sci. & Hum.	(25)	12.0	88.0	.0	8.3	87.5	4.2
Pub. Ad. & Law	(11)	.0	100.0	.0	9.1	90.9	.0
Health	(10)	20.0	80.0	11.1	.0	88.9	.0
Other	(14)	14.3	85.7	14.3	.0	85.7	.0
Rank							
Preferred	(436)	8.6%	91.4%	6.1%	4.3%	88.3%	1.3%
Not Preferred	(61)	12.8	87.2	6.5	2.2	89.1	2.2

Source: IIE/USAID Student Survey, 1987.

Table 14

Fields of Study of Foreign Graduate Students
by Sponsorship and Post-School Plans: 1986-87

	Sponsored				Nonsponsored			
	(n)	Further Study	Work in Home Country	Work in Other Country	(n)	Further Study	Work in Home Counrty	Work in Other Country
Total	**(269)**	**3.4%**	**92.6%**	**4.1%**	**(228)**	**4.0%**	**71.5%**	**24.1%**
Current Field								
Agriculture	(54)	5.6%	92.6%	1.8%	(24)	4.2%	79.2%	16.7%
Business	(34)	.0	94.1	5.9	(47)	4.3	68.1	25.5
Education	(30)	3.3	96.7	.0	(19)	.0	94.7	5.3
Engineering	(44)	.0	97.8	2.3	(34)	2.9	61.8	35.3
Science/Math	(39)	7.7	67.9	15.4	(30)	3.3	60.0	36.7
Soc.Sci./Hum.	(32)	6.2	90.6	3.1	(30)	.0	73.3	26.7
Pub. Ad./Law	(18)	.0	100.0	.0	(14)	7.4	71.4	21.4
Health	(12)	.0	100.0	.0	(12)	25.0	66.7	8.3
Other	(4)	.0	100.0	.0	(18)	.0	83.3	16.7
Rank								
Preferred	(250)	3.2%	93.6%	3.2%	(186)	4.3%	70.4%	24.7%
Not Preferred	(19)	5.3	79.0	15.8	(42)	2.4	76.2	21.4

Source: IIE/USAID Student Survey, 1987.

Table 15
Fields of Study of Foreign Graduate Students
by Sponsorship and Prior Occupation: 1986-87

	(n)	Univ. Fac. Unspec.	Research Asst.	Teacher	High Civil Serv.	High Private Sector	Other	Not in Labor Force
Sponsored								
Total	**(270)**	**25.2%**	**9.3%**	**3.0%**	**18.5%**	**16.3%**	**1.8%**	**25.9%**
Current Field								
Agriculture	(54)	24.1%	18.5%	.0%	20.4%	13.0%	.0%	24.1%
Business	(34)	8.8	.0	.0	26.5	26.5	8.8	29.4
Education	(30)	23.3	.0	16.7	26.7	10.0	.0	23.3
Engineering	(45)	33.3	4.4	2.2	20.0	22.2	.0	17.8
Sci. & Math.	(39)	33.3	18.0	2.6	2.6	12.8	.0	30.8
Soc. Sci. & Hum.	(32)	31.2	9.4	3.1	9.4	6.2	3.1	37.5
Pub. Ad. & Law	(18)	11.1	16.7	.0	38.9	16.7	5.6	11.1
Health	(12)	41.7	.0	.0	.0	16.7	.0	41.7
Other	(4)	.0	.0	.0	.0	75.0	.0	25.0
Rank								
Preferred	(251)	25.1%	9.6%	3.2%	17.9%	16.3%	1.6	26.3%
Not Preferred	(19)	26.3	5.3	.0	26.3	15.8	5.3	21.0
Nonsponsored								
Total	**(239)**	**5.4%**	**2.1%**	**5.0%**	**4.2%**	**17.2%**	**4.6%**	**61.5%**
Current Field								
Agriculture	(24)	16.7%	8.3%	4.2%	8.3%	16.7%	4.2%	41.7%
Business	(50)	.0	.0	8.0	2.0	32.0	4.0	54.0
Education	(19)	10.5	.0	21.0	.0	10.5	10.5	47.4
Engineering	(36)	8.3	5.6	.0	5.6	5.6	5.6	66.7
Sci. & Math	(34)	2.9	.0	2.9	2.9	.0	.0	85.3
Soc. Sci. & Hum.	(31)	9.7	3.2	.0	3.2	9.7	9.7	64.5
Pub. Ad. & Law	(14)	.0	.0	.0	.0	35.7	7.1	57.1
Health	(12)	.0	.0	8.3	16.7	.0	.0	66.7
Other	(19)	.0	.0	5.3	5.3	.0	.0	63.2
Rank								
Preferred	(194)	6.7%	2.1%	4.6%	4.1%	17.0%	5.2%	60.3%
Not Preferred	(45)	.0	2.2	6.7	4.4	17.8	2.2	66.7

Source: IIE/USAID Student Survey, 1987.

Table 16
Fields of Study of Foreign Graduate Students
by Sponsorship and Age: 1986-87

		Sponsored			
		22 years and under	23 to 25 years	26 to 35 years	36 years and over
Total	**(270)**	**2.2%**	**5.6%**	**57.4%**	**34.8%**
Current Field					
Agriculture	(54)	3.7%	.0%	59.3%	37.0%
Business	(34)	2.9	17.6	58.9	23.5
Education	(30)	3.3	3.3	50.0	43.3
Engineering	(45)	2.2	2.2	68.9	26.7
Science & Math	(39)	2.6	2.8	64.5	20.5
Soc. Sci. & Hum.	(32)	.0	3.1	37.5	59.4
Pub. Ad. & Law	(18)	.0	.0	38.9	61.1
Health	(12)	.0	8.3	83.3	8.3
Other	(4)	.0	.0	75.0	25.0
Rank					
Preferred	(251)	2.0%	4.8%	59.4%	33.9%
Not Preferred	(19)	5.3	15.8	31.6	47.4
		Nonsponsored			
		22 years and under	23 to 25 years	26 to 35 years	36 years and over
Total	**(239)**	**10.5%**	**20.5%**	**51.5%**	**17.6%**
Current Field					
Agriculture	(24)	.0%	4.2%	58.3%	37.5%
Business	(50)	10.0	22.0	60.0	8.0
Education	(19)	.0	5.3	57.9	36.8
Engineering	(36)	11.1	30.6	47.2	11.1
Science & Math	(34)	17.6	35.3	44.1	2.9
Soc. Sci. & Hum.	(31)	16.1	12.9	38.7	32.3
Pub. Ad. & Law	(14)	.0	.0	37.5	62.5
Health	(12)	16.7	25.0	50.0	8.3
Other	(19)	15.8	31.6	31.6	21.0
Rank					
Preferred	(194)	9.8%	22.7%	51.6%	16.0%
Not Preferred	(45)	13.3	11.1	51.1	24.4

Source: IIE/USAID Student Survey, 1987.

Table 17
Characteristics of Foreign Graduate Students by Age: 1986-87

	Total	22 years or under	23 to 25 years	26 to 35 years	36 years and over
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Prior Occupation					
Univ. Faculty	15.9%	3.2%	3.1%	15.5%	25.7%
Research Asst.	5.9	.0	1.6	5.0	11.0
Teacher	11.8	.0	1.6	5.0	3.7
High Level Civ. Ser.	3.9	6.4	4.7	10.4	19.1
High Level Private	16.7	9.7	7.8	20.9	14.0
Other	3.0	3.2	3.1	3.2	2.9
Not in LF, Unspec.	42.6	77.4	78.1	40.0	23.5
Post-School Plans					
Further Study	3.6%	3.4%	1.6%	5.2%	1.5%
Work in Home Cntry.	83.1	51.7	72.1	84.2	91.8
Work in Other Cntry.	13.3	44.8	26.2	10.3	6.7
Dependents					
None	42.4%	71.0%	87.5%	40.3%	19.8%
Any	57.6	29.0	12.5	59.7	80.2
Geographic Origin					
Rural	5.3%	6.4%	3.1%	6.1%	4.4%
Town	11.7	12.9	4.7	12.6	13.2
City	54.6	16.1	45.3	55.4	54.4
Capital	31.4	64.5	46.9	25.9	27.2
Father's Occupation					
Univ. Faculty/Res.	2.8%	.0%	3.1%	4.0%	.7%
High Level Civ. Ser.	20.6	16.1	18.8	21.6	20.6
Teacher	1.6	3.2	.0	1.4	2.2
High Level Private	32.0	61.3	64.1	28.4	17.6
Other	33.4	19.4	6.2	35.2	45.6
Not in LF, Unspec.	9.6	.0	7.8	8.4	13.2
Father's Education					
Elementary	29.9%	9.7%	9.4%	28.4%	47.1%
Secondary	22.0	25.8	14.1	21.2	26.5
Higher Vocational	10.6	16.1	18.8	10.4	5.9
Higher Education	36.2	48.4	56.2	38.5	19.1
Unspec.	1.4	.0	1.6	1.4	1.5
Country					
Brazil	25.5%	3.2%	28.1%	28.4%	23.5%
Egypt	7.7	3.2	1.6	8.6	9.6
Indonesia	32.8	51.6	50.0	25.5	35.3
Jamaica	6.5	6.4	14.1	7.6	.7
Nigeria	27.5	35.5	6.2	29.9	30.9

Source: IIE/USAID Student Survey, 1987.

Table 18
Fields of Study of Foreign Graduate Students
by Sponsorship and Gender: 1986-87

	Sponsored			Nonsponsored		
	(n)	Male	Female	(n)	Male	Female
Total	**(270)**	**79.3**	**20.7%**	**(238)**	**72.8%**	**26.8%**
Current Field						
Agriculture	(54)	88.9%	11.1%	(24)	95.8%	4.2%
Business	(34)	82.4	17.6	(50)	72.0	28.0
Education	(30)	70.0	30.0	(119)	57.9	42.1
Engineering	(45)	93.3	6.7	(36)	86.1	11.1
Science & Math	(39)	66.7	33.3	(34)	79.4	20.6
Soc. Sci. & Hum.	(32)	68.8	31.2	(31)	64.5	35.5
Pub. Ad. & Law	(18)	77.8	22.2	(14)	71.4	28.6
Health	(12)	75.0	25.0	(12)	58.3	41.7
Other	(4)	75.0	25.0	(19)	58.3	41.7
Rank						
Preferred	(251)	80.9%	19.1%	(193)	74.2%	25.3%
Not Preferred	(19)	57.9	42.1	(45)	66.7	33.3

Source: IIE/USAID Student Survey, 1987.

Table 19
Fields of Study of Foreign Graduate Students
by Sponsorship and Presence of Dependents: 1986-87

	Sponsored			Nonsponsored		
	(n)	None	Any	(n)	None	Any
Total	**(270)**	**28.5%**	**71.5%**	**(239)**	**58.6%**	**41.4%**
Current Field						
Agriculture	(54)	22.2%	77.8%	(24)	33.3%	66.7%
Business	(34)	29.4	70.6	(50	68.0	32.0
Education	(30)	23.3	76.7	(19)	36.8	63.2
Engineering	(45)	22.2	77.8	(36)	61.1	38.9
Science & Math	(39)	48.7	51.3	(34)	64.7	35.3
Soc. Sci. & Hum.	(32)	28.1	71.9	(31)	61.3	38.7
Pub. Ad. & Law	(18)	33.3	66.7	(14)	42.9	57.1
Health	(12)	16.7	83.3	(12)	83.3	16.7
Other	(4)	.0	100.0	(19)	63.2	36.8
Rank						
Preferred	(251)	28.7%	71.3%	(194)	59.8%	40.2%
Not Preferred	(19)	26.3	73.7	(145)	53.3%	46.7

Source: IIE/US Aid Student Survey, 1987.

Table 20
Fields of Study of Foreign Graduate Students
by Sponsorship and Geographic Origin: 1986-87

		Sponsored			
	(n)	Rural	Town	City	Capital City
Total	**(269)**	**3.7%**	**13.7%**	**57.8%**	**24.4%**
Current Field					
Agriculture	(54)	9.3%	20.8%	57.4%	11.1%
Business	(34)	.0	8.8	41.2	50.0
Education	(30)	3.3	30.0	53.3	13.3
Engineering	(45)	4.4	6.7	57.8	31.1
Science & Math	(39)	.0	12.8	66.7	20.5
Soc. Sci. & Hum.	(32)	6.2	6.2	71.9	15.6
Pub. Ad. & Law	(18)	.0	11.1	44.4	44.4
Health	(12)	.0	8.3	66.7	25.0
Other	(4)	.0	25.0	50.0	25.0
Rank					
Preferred	(250)	3.6%	13.2%	57.8%	25.1%
Not Preferred	(19)	5.3	21.0	57.9	15.8
		Nonsponsored			
	(n)	Rural	Town	City	Capital City
Total	**(239)**	**7.1%**	**9.6%**	**44.4%**	**38.9%**
Current Field					
Agriculture	(24)	16.7%	16.7%	50.0%	16.7%
Business	(50)	4.0	8.0	50.0	38.0
Education	(19)	15.8	15.8	63.2	5.3
Engineering	(36)	2.8	5.7	38.9	52.8
Science & Math	(34)	8.8	11.8	41.2	38.2
Soc. Sci. & Hum.	(31)	6.4	38.7	45.2	—
Pub. Ad. & Law	(14)	.0	14.3	35.7	50.0
Health	(12)	.0	.0	42.9	66.7
Other	(19)	5.3	10.5	31.9	52.7
Rank					
Preferred	(194)	6.7%	9.8%	44.3%	39.2%
Not Preferred	(45)	8.9	8.9	44.4	37.8

Source: IIE/USAID Student Survey, 1987.

Table 21
Fields of Study of Foreign Graduate Students
by Sponsorship and Father's Occupation: 1986-87

	(n)	Univ. Fac.	High Civil Serv.	Teacher	High Private Sector	Other	Not in Labor Force Unspec.
			Sponsored				
Total	**(270)**	**3.3%**	**20.7%**	**2.6%**	**23.0%**	**38.9%**	**11.5%**
Current Field							
Agriculture	(54)	.0%	25.9%	1.8%	14.8%	46.3%	11.1%
Business	(34)	2.9	20.6	2.9	32.4	35.3	5.9
Education	(30)	3.3	16.7	6.7	6.7	63.3	3.3
Engineering	(45)	11.1	13.3	2.2	33.3	26.6	13.3
Sci. & Math.	(39)	2.6	28.2	.0	15.4	35.9	17.9
Soc. Sci. & Hum.	(32)	.0	28.1	3.1	37.5	25.0	.0
Pub. Ad. & Law	(18)	5.6	.0	5.6	22.2	38.9	27.8
Health	(12)	.0	16.7	.0	25.0	50.0	8.3
Other	(4)	.0	25.0	.0	25.0	25.0	25.0
Rank							
Preferred	(251)	3.6%	20.3%	2.8%	23.1%	38.2%	12.0%
Not Preferred	(19)	.0	26.3	.0	21.0	47.4	5.3
			Nonsponsored				
Total	**(239)**	**2.1%**	**20.5%**	**.4%**	**42.3%**	**27.2%**	**7.3%**
Current Field							
Agriculture	(24)	4.2%	20.8%	.0%	25.0%	45.8%	4.2%
Business	(50)	2.0	20.0	.0	48.0	24.0	6.0
Education	(19)	.0	21.0	.0	36.8	31.6	10.5
Engineering	(36)	5.6	11.1	2.8	41.7	30.6	7.3
Sci. & Math	(34)	.0	11.8	.0	64.7	20.6	2.9
Soc. Sci. & Hum.	(31)	3.2	25.8	.0	32.3	32.3	6.4
Pub. Ad. & Law	(14)	.0	35.7	.0	28.6	7.1	28.6
Health	(12)	.0	.0	.0	50.0	33.3	16.7
Other	(19)	.0	47.4	.0	36.8	15.8	.0
Rank							
Preferred	(194)	2.6%	19.6%	.5%	43.3%	25.8%	8.2%
Not Preferred	(45)	.0	24.4	.0	37.8	33.3	4.4

Source: IIE/USAID Student Survey, 1987.

Table 22
Fields of Study of Foreign Graduate Students
by Sponsorship and Father's Education: 1986-87

	(n)	Elementary	Secondary	Higher Voc.	Higher Educ.	Not Specified
Sponsored						
Total	**(270)**	**33.3%**	**23.7%**	**10.0%**	**31.8%**	**1.1%**
Current Field						
Agriculture	(54)	42.6%	31.5%	14.8%	11.1%	.0%
Business	(34)	20.6	23.5	14.7	41.8	.0
Education	(30)	50.0	30.0	3.3	16.7	.0
Engineering	(45)	20.0	15.6	8.9	55.6	.0
Sci. & Math.	(39)	41.3	2.6	7.7	46.2	2.6
Soc. Sci. & Hum.	(32)	25.0	34.4	9.4	31.2	.0
Pub. Ad. & Law	(18)	38.9	22.2	5.6	27.8	5.6
Health	(12)	41.7	41.7	8.3	8.3	.0
Other	(4)	.0	25.0	.0	50.0	25.0
Rank						
Preferred	(251)	34.7%	22.7%	10.0%	31.9%	.8%
Not Preferred	(19)	15.8	36.8	10.5	31.6	5.3
Nonsponsored						
Total	**(239)**	**25.9%**	**20.1%**	**11.3%**	**41.0%**	**1.7%**
Current Field						
Agriculture	(24)	33.3%	12.5%	12.5%	37.5%	4.2%
Business	(50)	30.0	28.0	6.0	34.0	2.0
Education	(19)	42.1	21.0	5.3	31.6	.0
Engineering	(36)	13.9	36.1	.0	50.0	.0
Sci. & Math	(34)	14.7	23.5	29.4	32.4	.0
Soc. Sci. & Hum.	(31)	38.7	6.4	16.1	35.5	3.2
Pub. Ad. & Law	(14)	14.3	14.3	7.1	64.3	.0
Health	(12)	33.3	.0	16.7	41.7	8.3
Other	(19)	15.8	10.5	10.5	63.2	.0
Rank						
Preferred	(194)	24.7%	20.1%	10.3%	43.3%	1.6%
Not Preferred	(45)	31.1	20.0	15.6	31.1	2.2

Source: IIE/USAID Student Survey, 1987.

Table 23
Fields of Study of Foreign Graduate Students
by Sponsorship and Native Country: 1986-87

		Sponsored				
	(n)	Brazil	Egypt	Indonesia	Jamaica	Nigeria
Total	**(270)**	**34.8%**	**8.5%**	**39.6%**	**3.3%**	**13.7%**
Current Field						
Agriculture	(54)	35.2%	18.5%	35.2%	.0%	11.1%
Business	(34)	26.5	.0	58.8	5.9	8.8
Education	(30)	23.3	3.3	30.0	3.3	40.0
Engineering	(36)	35.6	13.3	37.8	4.4	8.9
Science & Math	(39)	48.7	2.6	38.5	5.1	5.1
Soc. Sci. & Hum.	(32)	43.8	6.2	31.2	.0	18.8
Pub. Ad. & Law	(18)	22.0	.0	66.7	.0	11.1
Health	(12)	41.7	16.7	25.0	16.7	.0
Other	(4)	25.0	25.0	.0	.0	50.0
Rank						
Preferred	(251)	36.2%	8.8%	39.8%	2.8%	12.4%
Not Preferred	(19)	15.8	5.3	36.8	10.5	31.6%

		Nonsponsored				
	(n)	Brazil	Egypt	Indonesia	Jamaica	Nigeria
Total	**(239)**	**15.1%**	**6.7%**	**25.1%**	**10.0%**	**43.1%**
Current Field						
Agriculture	(24)	16.7%	8.3%	8.3%	.0%	66.7%
Business	(50)	16.0	2.0	30.0	12.0	40.0
Education	(19)	5.3	.0	5.3	10.5	79.0
Engineering	(45)	13.9	22.2	36.1	2.8	25.0
Science & Math	(34)	17.6	.0	47.1	14.7	20.6
Soc. Sci. & Hum.	(31)	22.6	3.2	22.6	12.9	38.7
Pub. Ad. & Law	(14)	7.1	21.4	7.1	7.1	57.1
Health	(12)	25.0	.0	.0	33.3	41.7
Other	(19)	5.3	5.3	26.3	5.3	57.9
Rank						
Preferred	(194)	18.6%	7.7%	24.7%	8.2%	40.7%
Not Preferred	(95)	.0	2.2	26.7	17.8	53.3

Source: IIE/USAID Student Survey, 1987.

3. Reasons for Field of Study Choices

Comparisons of differences in actual field of study choices by sources of financing provide one set of findings on how nonsponsored and sponsored students find themselves in their current fields. A set of items in the questionnaire provide the basis for a complementary investigation of the principal research question. In these, respondents were asked to indicate why they chose their current field of study. Respondents checked any of sixteen separate reasons (including one open-ended response option) and then were asked to indicate which of the checked reasons was most important in influencing their field of study choice. Respondents also identified the second and third most important reasons, if appropriate. The sixteen reasons (augmented by seven options developed in the coding of the open-ended response) have been collapsed into six categories, as shown in Chart 3. A separate set of items posed direct questions about restrictions on field of study choices and the influence of the primary financing source on the student's field of study decision.

Why then, did foreign students choose the fields they entered? Among graduate students, 33.2 percent identified their own personal interests and preferences as the most important reason (Table 24). Another 33.0 percent identified employment-related reasons (better able to find a job; employer encouragement; promotion or improvement in present job). These reasons are frequently related to government policies, since the sending country government is often the largest employer. Some 6.1 percent ranked financing or costs at the host college or university as the most important reason, while 6.9 percent specifically checked the availability of donor financing in the field as most important. Among undergraduates, personal preferences (38.0 percent) and employment-related reasons (40.1 percent) were identified as most important. At both academic levels, then, reasons other than financing were believed to have had a significant influence on the choice among fields.

Chart 3

Classification of Reasons for Enrolling in Current Field

Personal Preferences	Parents/relatives encouraged me
	Friends encouraged me
	Personal interest
	Family reasons (join spouse)
Ability	Requires less English skills
	Host university academic constraints
Government Influence	Government encouraged me
	School encouraged me
	Government does not approve of preferred field
	School does not approve of preferred field
Employment Influence	Employer encouraged me
	Leads to promotion
	Better able to find job in home country
	Better able to find job in other country
	Better able to find job (unspecified)
	Better prepared for job in this field
	Relevant to present job
	Skills in short supply in home country
College Finance	Assistantship in this field
	Cost in other program too great
	Funding limited in other field
Sponsor Finance	Funding in this field

While the ranking of reasons remains similar when foreign students are divided according to the ways in which they financed their studies, the donor finance issue becomes much more important. Among sponsored graduate students, the availability of donor financing in the field was listed as important by 11.8 percent. For those with support from a sponsor as their primary source of

support, the availability of donor support was most highly ranked by 13.2 percent. Nonetheless, personal preferences or employment-related reasons were ranked as most important regardless of the source of financing.

Asked if any of their sponsors restricted the fields in which they could enroll, 19.8 percent of the graduate students and fewer than five percent of the undergraduates answered yes. Twenty percent of the graduate students and 9.7 percent of the undergraduates indicated that their home government restricted the fields in which they could enroll. But, when asked whether a restriction imposed by their primary funding source had, in fact, influenced the choice, only 14 percent of the graduate students and about 7 percent of the undergraduates said yes. Graduate students who were not sponsored or who relied primarily on personal or family sources reported fewer restrictions by any of their sponsors or by their home governments and, accordingly, were least likely to indicate that restrictions imposed by their primary funding source had influenced their choices of fields.

As displayed in Table 25, personal preferences and employment-related reasons ranked as the most important in making field of study choices by foreign students with a variety of specified characteristics. At the graduate level, Brazilians were most likely to put personal preferences as most important (45.4 percent), while Jamaicans most frequently identified employment-related reasons (42.4 percent). About one-tenth of Egyptian graduate students listed the availability of donor finance as most important in their choice of fields. Males more than females, and those with dependents more than those with none, ranked such financial considerations as host institution costs or financing or donor funding as the most important reason in deciding on a field of study, (although the proportions, in no case, exceed 10 percent). Not surprisingly, those planning to return home after graduation were more likely to list home government/university restrictions as most important (8.2 percent did so), but personal preferences (31.3 percent) and employment-related reasons (32.8 percent) still represented the most frequently cited reasons.

In response to the set of direct questions on the presence and influence of restrictions on field of study choices, a mere 3.0 percent of Jamaican graduate students reported that restrictions imposed by their primary funding source had actually influenced their choice (Table 26). Females were similarly unaffected (at 8.3 percent). Interestingly, 25.9 percent of foreign graduate students who came from the rural areas of their countries indicated that their primary funding source had influenced their field of study choices. This indicates the greater dependence of these students on the priorities of the sponsoring agencies. Graduate students coming from high level civil service positions (heads of agencies, researchers) were similarly likely to indicate that their primary funding source had influenced their decisions. The older the workers, the more likely they are

to have a narrow career direction and thus the easier it is to specify the requisite training. Finally, of those planning to return to work in their home countries following graduation, some 21.8 percent reported that their primary funding source restricted the fields in which they could enroll. Those planning to work in a country other than their own were less likely to report such restrictions (13.6 percent), a difference largely owing to the limited use of support from a sponsor by those not planning to return home. Still, for both groups, the proportions reporting that the primary funding source had actually influenced their choices were just about the same (13.4 percent versus 12.1 percent).

The reasons students reported as most important in making their field of study decisions differed somewhat across fields. As shown in Table 27, foreign graduate students in health profession programs and in natural science and mathematics were more likely to rank personal preferences as the most important reason (54.2 percent and 46.6 percent, respectively). Education majors were among the least likely to identify personal preferences as most important (20.4 percent of them did so). This appears to reflect the general dissatisfaction of education specialists with their field of study. However, some 16.3 percent of education majors ranked donor financing as most important (a finding that results, in part, from the relatively larger share of graduate students in education programs receiving support from a sponsor). Interestingly, in engineering and the natural sciences—two broad fields of study typically targeted by donors—relatively small shares of graduate students reported that the availability of donor financing was most important in their decisions to enter this field (2.5 percent and 1.4 percent, respectively).

These findings are generally supported by the patterns of responses to the set of direct questions on sponsor restrictions (Table 28). Looking again at the graduate level, 26.5 percent of foreign students enrolled in education reported that restrictions imposed by their primary funding source actually influenced their choice of the field. This share is almost twice the average for all graduate students. Those enrolled in health professions programs were least likely to report that sponsor restrictions influenced their choices (8.3 percent of them did so) because, if the restrictions existed, they were congruent with the students own preferences in any case.

Table 24

Reported Reasons for Enrolling in Current Field for Sponsored and Nonsponsored Students by Level: 1986-87

	Total	Sponsorship: Sponsored	Sponsorship: Nonsponsored	Primary Source of Support: Sponsor	Primary Source of Support: U.S. College	Primary Source of Support: Personal & Family	Primary Source of Support: Current Employment
Graduate							
Most Important Reason							
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Preference	33.2	34.1	32.2	33.2	34.3	34.3	8.3
Ability	5.5	6.3	4.6	7.0	1.5	5.6	.0
Home Univ./Govt.	6.9	10.0	3.4	10.7	4.4	2.8	8.3
Employment	33.0	29.3	37.2	28.9	25.0	39.9	58.3
Host Univ. Fin.	6.1	2.6	10.0	2.1	19.1	6.2	.0
Donor Finance	6.9	11.8	1.3	13.2	.0	1.7	.0
Not Reported	8.4	5.9	11.3	5.8	11.8	9.6	25.0
Sponsor Restrictions (did any sponsor restrict fields?)							
(percent yes)	19.8%	30.7%	7.5%	31.8%	17.6%	5.1%	8.3%
Government Restrictions (did home government restrict fields?)							
(percent yes)	20.0%	28.5%	10.5%	29.3%	16.2%	10.1%	8.3%
Primary Source Influenced (was field entered because of sponsor restriction?)							
(percent yes)	14.0%	16.3%	11.3%	17.8%	23.5%	5.1%	8.3%
Undergraduate							
Most Important Reason							
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Preference	38.0	26.9	39.1	17.6	54.6	39.2	25.0
Ability	3.9	11.5	3.2	5.9	.0	4.1	.0
Home Univ./Govt.	2.9	15.4	1.6	23.5	9.1	1.2	.0
Employment	40.1	23.1	41.9	29.4	18.2	42.0	50.0
Host Univ. Finan.	2.9	3.8	2.8	.0	9.1	2.4	.0
Donor Finance	1.8	15.4	.4	17.6	.0	.0	25.0
Not Reported	10.4	3.8	11.1	5.9	9.1	11.0	.0
Sponsor Restrictions (did any sponsor restrict fields?)							
(percent yes)	3.9%	11.5%	3.2%	17.6%	.0%	3.3%	.0%
Government Restrictions (did home government restrict fields?)							
(percent yes)	9.7%	30.8%	7.5%	41.2%	9.1%	7.4%	25.0%
Primary Source Influenced (was field entered because of sponsor restriction?)							
(percent yes)	6.8%	26.9%	4.7%	35.3%	.0%	4.9%	25.0%

Table 25

Reported Reasons for Enrolling in Current Field for Foreign Students with Identified Characteristics by Level: 1986-87

	Preference	Ability	Home Govt./ Univ.	Employment	Host Univ. Finance	Donor Finance	Not Reported
	Graduate Most Important Reason						
Total	**33.2%**	**5.5%**	**6.9%**	**33.0%**	**6.1%**	**6.9%**	**8.4%**
Country							
Brazil	45.4%	8.5%	1.5%	31.5%	3.8%	3.8%	5.4%
Egypt	28.2	5.1	18.0	20.5	2.6	10.3	15.4
Indonesia	29.3	6.0	12.0	35.9	3.0	9.6	4.2
Jamaica	27.3	3.0	.0	42.4	12.1	3.0	12.1
Nigeria	29.3	2.9	4.3	32.1	11.4	6.4	13.6
Gender							
Male	31.7%	5.2%	8.0%	31.2%	7.2%	8.0%	8.8%
Female	37.5	6.7	3.3	29.2	2.5	3.3	7.5
Dependents							
None	37.3%	4.2%	3.7%	37.3%	5.5%	4.2%	7.8%
Any	30.1	6.5	9.2	29.8	6.5	8.9	8.9
Age							
22 years or under	41.9%	.0%	6.4%	38.7%	3.2%	6.4%	3.2%
23 to 25 years	37.5	3.1	3.1	37.5	9.4	.0	9.4
26 to 35 years	36.7	5.0	6.1	30.2	6.5	7.2	8.3
36 years and over	22.1	8.8	10.3	35.3	4.4	9.6	9.6
Geographic Origin							
Rural	29.6%	3.7%	7.4%	18.5%	11.1%	11.1%	18.5%
Town	23.3	6.7	8.3	30.0	10.0	15.0	6.7
City	36.6	6.1	5.0	33.2	5.7	5.3	8.0
Capital	31.4	4.4	9.4	36.5	4.4	5.7	8.2
Prior Occupation							
Univ. Faculty	38.3%	8.6%	9.9%	22.2%	2.5%	11.1%	7.4%
Research Asst.	40.0	10.0	6.7	30.0	3.3	6.7	3.3
Teacher	20.0	5.0	.0	30.0	20.0	15.0	10.0
High Lev. Civ. Ser.	18.3	8.3	11.7	46.7	.0	8.3	6.7
High Lev. Private	29.4	5.9	5.9	38.8	4.7	4.7	10.6
Other	37.5	.0	.0	50.0	.0	6.2	6.2
Not in LF	36.9	3.2	6.0	30.4	9.2	5.1	9.2
Post-School Plans							
Further Study	61.1%	5.6%	.0%	22.2%	.0%	11.1%	.0%
Work Home Cntry.	31.3	5.8	8.2	32.8	5.6	7.3	9.0
Work Other Cntry.	33.3	1.5	1.5	42.4	7.6	4.6	9.1

Table 25 *(continued)*

Reported Reasons for Enrolling in Current Field for Foreign Students with Identified Characteristics by Level: 1986-87

	(n)	Preference	Ability	Home Govt./ Univ.	Employment	Host Univ. Finance	Donor Finance	Not Reported
				Undergraduate				
				Most Important Reason				
Total	**(279)**	**38.0%**	**3.9%**	**2.9%**	**40.1%**	**2.9%**	**1.8%**	**10.4%**
Country								
Brazil	(17)	70.6%	.0%	.0%	29.4%	.0%	.0%	.0%
Egypt	(2)	.0	.0	.0	100.0	.0	.0	.0
Indonesia	(160)	36.9	3.1	1.9	45.0	1.2	1.2	10.6
Jamaica	(48)	50.0	.0	4.2	31.2	2.1	4.2	8.3
Nigeria	(51)	21.6	11.8	5.9	33.3	9.8	2.0	15.7
Gender								
Male	(182)	34.1%	5.0%	3.3%	39.6%	4.4%	1.1%	12.6%
Female	(97)	45.4	2.1	2.1	41.2	.0	3.1	6.2
Dependents								
None	(250)	40.8%	3.2%	2.0%	40.0%	2.8%	1.2%	10.0%
Any	(29)	13.8	10.3	10.3	41.4	3.4	6.9	13.8
Age								
22 years or under	(91)	44.0%	3.3%	2.2%	40.7%	1.1%	.0%	8.8%
23 to 25 years	(128)	39.8	3.1	2.3	38.3	3.1	2.3	10.9
26 to 35 years	(54)	24.1	5.6	3.7	44.4	5.6	3.7	13.0
36 years and over	(6)	33.3	16.7	16.7	33.3	.0	.0	.0
Geographic Origin								
Rural	(9)	44.4%	.0%	22.2%	11.1%	11.1%	.0%	11.1%
Town	(29)	41.4	10.3	3.4	24.1	3.4	3.4	13.8
City	(111)	36.9	1.8	.9	46.8	2.7	1.8	9.0
Capital	(129)	37.2	4.6	3.1	40.3	2.3	1.6	10.8
Prior Occupation								
Univ. Faculty	(1)	100.0%	.0%	.0%	.0%	.0%	.0%	.0%
Research Asst.	—	—	—	—	—	—	—	—
Teacher	(3)	.0	33.3	33.3	.0	.0	33.3	.0
High Lev. Civ. Ser.	(8)	25.0	25.0	25.0	12.5	.0	.0	12.5
High Lev. Private	(21)	47.6	4.8	.0	38.1	4.8	4.8	.0
Other	(15)	6.7	6.7	.0	53.3	13.3	.0	20.0
Not in LF	(231)	39.8	2.6	2.2	41.1	2.2	1.3	10.8
Post-School Plans								
Further Study	(24)	33.3%	4.2%	4.2%	37.5%	4.2%	.0%	16.7%
Work Home Cntry.	(156)	37.8	3.8	3.2	38.5	1.9	2.6	12.2
Work Other Cntry.	(83)	38.6	2.4	1.2	45.8	4.8	.0	7.2

Table 26

Restrictions on Field of Study Choices Reported by Foreign Students with Identified Characteristics by Level: 1986-87

	Graduate			
		(percent responding yes)		
	(n)	Sponsor Restricts Choice of Field	Government Restricts Choice of Field	Primary Source of Financing Influenced
Total	**(509)**	**19.8%**	**20.0%**	**14.0%**
Country				
Brazil	(130)	20.8%	13.%8	8.5%
Egypt	(39)	20.5	30.8	15.4
Indonesia	(167)	22.8	20.4	16.2
Jamaica	(33)	12.1	27.3	3.0
Nigeria	(140)	17.1	20.7	18.6
Gender				
Male	(388)	20.6%	19.8%	15.7%
Female	(120)	17.5	20.8	8.3
Dependents				
None	(217)	14.8%	11.5%	9.7%
Any	(292)	23.6	26.4	17.1
Age				
22 years and under	(31)	16.1%	16.1%	16.1%
23 to 25 years	(64)	12.5	7.8	9.4
26 to 35 years	(278)	21.6	22.3	14.4
36 years and over	(136)	20.6	22.1	14.7
Geographic Origin				
Rural	(27)	7.4%	29.6%	25.9%
Town	(60)	21.7	31.7	18.3
City	(262)	22.5	17.9	16.0
Capital	(159)	17.0	17.6	6.9
Prior Occupation				
University Faculty	(81)	24.7%	25.9%	14.8%
Research Assistant	(30)	30.0	16.7	6.7
Teacher	(20)	10.0	25.0	10.0
High Lev. Civ. Ser.	(60)	26.7	28.3	23.3
High Lev. Private	(85)	29.4	24.7	14.1
Other	(16)	18.8	18.8	6.2
Not in Labor Force	(217)	12.0	13.8	12.9
Post-School Plans				
Further Study	(18)	5.6%	38.9%	11.1%
Work in Home Country	(412)	21.8	20.4	13.4
Work in Other Country	(66)	13.6	15.2	12.1

Source: IIE/USAID Student Survey, 1987.

Table 26 (*continued*)
Restrictions on Field of Study Choices Reported by Foreign Students with Identified Characteristics by Level: 1986-87

	Undergraduate			
		(percent responding yes)		
	(n)	Sponsor Restricts Choice of Field	Government Restricts Choice of Field	Primary Source of Financing Influenced
Total	**(279)**	**3.9%**	**9.7%**	**6.8%**
Country				
Brazil	(17)	11.1%	5.9%	.0%
Egypt	(2)	6.9	.0	.0
Indonesia	(160)	3.6	4.4	5.0
Jamaica	(98)	3.1	27.1	10.4
Nigeria	(51)	.0	11.8	9.8
Gender				
Male	(182)	2.8%	8.2%	5.5%
Female	(97)	6.2	12.4	9.3
Dependents				
None	(250)	4.0%	10.0%	6.0%
Any	(29)	3.4	6.9	13.8
Age				
22 years and under	(91)	3.3%	7.7%	6.6%
23 to 25 years	(128)	4.7	9.4	4.7
26 to 35 years	(54)	1.8	13.0	9.3
36 years and over	(6)	16.7	16.7	33.3
Geographic Origin				
Rural	(9)	11.1%	11.1%	11.1%
Town	(29)	6.9	13.8	6.9
City	(111)	3.6	6.3	7.2
Capital	(129)	3.1	11.6	6.2
Prior Occupation				
University Faculty	(1)	.0%	.0%	.0%
Research Assistant	—	—	—	—
Teacher	(3)	33.3	33.3	100.0
High Lev. Civ. Ser.	(8)	.0	12.5	12.5
High Lev. Private	(21)	9.5	23.8	9.5
Other	(15)	.0	6.7	13.3
Not in Labor Force	(231)	3.5	8.2	4.8
Post-School Plans				
Further Study	(24)	8.3%	4.2%	4.2%
Work in Home Country	(156)	4.5	13.5	8.3
Work in Other Country	(83)	1.2	3.6	4.8

Source: IIE/USAID Student Survey, 1987.

Table 27

Reported Reasons for Enrolling in Current Field by Field of Study and Level: 1986-87

		Most Important Reason						
		Preference	Ability	Home Govt./ Univ.	Employment	Host Univ. Finance	Donor Finance	Not Reported
Graduate								
Total	**(509)**	**33.2%**	**5.5%**	**6.9%**	**33.0%**	**6.1%**	**6.9%**	**8.4%**
Current Field								
Agriculture	(78)	33.3%	6.4%	6.4%	30.8%	5.1%	10.3%	7.7%
Business	(84)	25.6	8.3	7.1	40.5	10.7	4.8	3.6
Education	(49)	20.4	4.1	6.1	38.8	4.1	16.3	10.2
Engineering	(81)	33.3	7.4	11.1	29.6	6.2	2.5	9.9
Sci. & Math.	(73)	46.6	1.4	2.7	30.1	6.8	1.4	11.0
Soc. Sci. & Hum.	(63)	36.5	6.4	7.9	25.4	1.6	12.7	9.5
Pub. Ad. & Law	(32)	21.9	3.1	9.4	43.8	3.1	6.2	12.5
Health	(24)	54.2	4.2	4.2	25.0	.0	8.3	4.2
Other	(23)	30.4	4.4	4.4	34.8	17.4	.0	8.7
Rank								
Preferred	(445)	35.5%	5.4%	7.4%	33.0%	4.3%	7.2%	7.2%
Not Preferred	(64)	17.2	6.2	3.1	32.8	18.8	4.7	17.2
Undergraduate								
Total	**(279)**	**38.0%**	**3.9%**	**2.9%**	**40.1%**	**2.9%**	**1.8%**	**10.4%**
Current Field								
Agriculture	(8)	37.5%	12.5%	12.5%	25.0%	.0%	.0%	12.5%
Business	(74)	35.1	4.0	4.0	44.6	4.0	4.0	4.0
Education	(6)	33.3	16.7	.0	16.7	.0	16.7	16.7
Engineering	(80)	45.0	.0	2.5	41.2	1.2	.0	10.0
Sci. & Math	(50)	28.0	8.0	4.0	48.0	2.0	.0	10.0
Soc. Sci. & Hum.	(25)	48.0	.0	.0	28.0	8.0	.0	16.0
Pub. Ad. & Law	(11)	27.3	.0	.0	45.4	9.1	.0	18.2
Health	(10)	70.0	10.0	.0	.0	.0	10.0	10.0
Other	(14)	21.4	7.1	.0	42.9	.0	.0	28.6
Rank								
Preferred	(232)	39.2%	2.6%	3.0%	43.1%	1.7%	1.7	8.0%
Not Preferred	(47)	31.9	10.6	2.1	25.5	8.5	2.1	19.2

Source: IIE/USAID Student Survey, 1987.

Table 28

Restrictions on Field of Study Choices Reported by Foreign Students by Current Field and Level: 1986-87

	(n)	(percent responding yes) Sponsor Restricts Choice of Field	Government Restricts Choice of Field	Primary Source of Financing Influenced
		Graduate		
Total	**(509)**	**19.8%**	**20.0%**	**14.0%**
Current Field				
Agriculture	(78)	19.2%	19.2%	11.5%
Business	(84)	19.0	16.7	13.1
Education	(49)	30.6	32.6	26.5
Engineering	(81)	22.2	19.8	16.1
Science & Math	(73)	20.6	20.6	13.7
Soc. Sci. & Hum.	(63)	17.5	23.8	9.5
Pub. Ad. & Law	(32)	12.5	15.6	9.4
Health	(24)	20.8	16.7	8.3
Other	(23)	8.7	8.7	13.0
Rank				
Preferred	—	20.9%	19.6%	12.1%
Not Preferred	—	12.5	23.4	26.6
		Undergraduate		
Total	**(279)**	**3.9%**	**11.5%**	**3.2%**
Current Field				
Agriculture	(8)	.0%	.0%	.0%
Business	(74)	4.0	10.8	6.8
Education	(6)	16.7	33.3	33.3
Engineering	(80)	.0	8.8	3.8
Science & Math	(50)	10.0	8.0	10.0
Soc. Sci. & Hum.	(25)	.0	12.0	8.0
Pub. Ad. & Law	(32)	.0	.0	.0
Health	(24)	10.0	20.0	20.0
Other	(23)	.0	7.1	.0
Rank				
Preferred	—	3.0%	9.0%	4.7%
Not Preferred	—	8.5	12.7	17.0

Source: IIE/USAID Student Survey, 1987.

4. Conclusions

The survey research reported here is extraordinary in its potential for analysis. Because of the focus of this study on the policy issue of sponsorship and its effectiveness, the analysis of the association of sponsorship status, forms of financing, and student choice of field of study has dominated the discussion. Also, since sponsorship was discovered to be a minor factor among the undergraduate population, the largest part of the discussion concentrated on the graduate student population findings. Other researchers may wish to approach this data set with different questions concerning finance and field of study choices from those dealt with here.

One conclusion is, however, dramatically clear. Even with the inherent methodological limitations of survey research, this study has assembled a data set unique in its relevance to the policy issues presented in the introduction. Also, the analysis of this research has helped identify needs for improvement in any future survey research approaches to these issues.

The original population of respondents from the current survey numbered 868, of whom 300 were undergraduates. Because of the quality control exercised in the survey process, 92.7 percent of the responses were usable, resulting in a final respondent population of 805, of whom 279 were undergraduates and 17 were nondegree students. The sample had been structured around students from five sending countries: Brazil, Egypt, Indonesia, Jamaica, and Nigeria. The largest numbers were from Indonesia (342) and Nigeria (219), although the highest return rate for questionnaires was from Brazil (46.2 percent). Return rates for graduate students were dramatically higher than for undergraduates (36.0 percent to 20.5 percent).

The proportion of the males in the sample was 76.5 percent among graduate students and 65.5 percent among undergraduates. A majority (56.7 percent) of graduate students had dependents, while only 10.4 percent of undergraduate

students did. The proportion of undergraduates under the age of 22 was 50.6 percent, while 81.2 percent of graduate students were over 26 years of age. Students at both academic levels tended to be from urban centers (82.8 percent of graduates and 85.9 percent of undergraduates). Rural students represented only 5.3 percent and 3.2 percent of students at the two levels, respectively.

Undergraduate concentrations were in the fields of engineering (28.4 percent), business (26.6 percent), and natural science/mathematics (17.3 percent). For graduate students in the sample the most common fields of study were business (16.8 percent), engineering (15.4 percent), and agriculture (15.2 percent).

The definition of sponsorship was divided into four categories: foreign private sponsor, home government/university sponsor, U.S. government sponsor, and U.S. private sponsor. For graduate students, the proportion with assistance from one or more of these four categories was 53.0 percent, while for undergraduates it was only 9.3 percent. It was this finding that led the researchers to concentrate the analysis predominantly on graduate students.

Fewer than 25 percent of the graduate students receiving sponsor financing combine or "package" this financing with assistance from other sources. In fact, approximately one-half of the sponsored students appear to be fully funded, reporting no other sources than sponsor aid. This is a critically important finding in that it confirms the potential for extramarginal subsidization to be extensive and justifies examination of the need-based alternative to foreign student assistance as a legitimate policy alternative. Given that the most common form of packaging among the entire sample is the combination of personal/family support with instructional assistance, it obviously is not a radical suggestion that sponsored students also might explore these two alternative sources, and therewith facilitate the provision of sponsor support to a more socially diverse (or at least larger) population.

Another interesting finding is that over half of those foreign graduate students receiving sponsorship aid are senior civil servants or senior college or university faculty in their home country. This helps to explain the level of predominance of males in the sponsored student sample. In fact, females are a larger proportion of the nonsponsored group than of the sponsored group.

In terms of student placements in their preferred specialized field, 85.3 percent overall stated that their present field of specialization was their first choice. These responses ranged for graduate students from lows of 79.8 percent in business and 81.3 percent in education to a high of 93.6 percent in agriculture and 93.8 in engineering. (In contrast, only 50 percent of undergraduate majors in education cited that field as their first choice.) Even among those who were not in their preferred field, the degree of misplacement was often small.

For example, 29.2 percent of graduate students in business and 20.0 percent of those in education who were not in the specialization of their first choice wanted change only to another specialization in the same broad field.

Sponsored students in all fields indicated plans to return home; the proportion ranged only between 90 and 100 percent across all the fields, with the single exception of the natural sciences/mathematics category. It is worth noting that for graduate education this last field has always been a major source of what are characterized as "brain-drain" problems. The reason often has to do more with the developing nation's inability to provide adequate support personnel and equipment than with any objection by the graduates to returning to their home countries, *per se*.

Of significant policy interest is the finding that the future plans for nonsponsored students differed dramatically from those of sponsored students. In terms of plans to return home, the range of responses from nonsponsored students varied from a low of 60.0 percent for natural science/mathematics specialists to 94.7 percent for those in education fields. It is obvious that there is a strong association between sponsorship and the intent to return home and, one assumes, the probability of actually returning. However, further research, beyond simple cross-tabulation analysis, is needed to disentangle the causality linked to sponsorship from that linked to such coincident phenomena as student age (sponsored students are older) and government employment (sponsored students are more likely to be employed at a government agency or educational institution).

Related to the above point, the research indicates that the older students are more likely to be in the social sciences/humanities and public administration fields. This reflects the employment groups from which the older students are recruited but also is related to the fact that these are the two fields with traditionally low rates of international mobility.

The relationship of sponsorship to gender follows the expected pattern of overall male predominance. There are two fields, however, in which sponsored women actually outnumber nonsponsored women: these are agriculture and natural science/mathematics. Since both fields are characterized by high levels of sex role identity, sponsorship appears to be a major effective means of encouraging women to enter those two fields.

Among the graduate students, sponsored students had both more resources (because of sponsorship) and were significantly older on average. These two determinants combine to explain the higher incidence of dependents among the sponsored sample population.

A possible equity concern is suggested by the finding that the few village

and rural students in the graduate population are concentrated in agriculture and education, the two lowest-cost fields of study in most institutions. Thus, not only are these students less likely to participate in foreign study but, when they do, they are likely to receive the lowest subsidization in terms of program costs and, because of the nature of agriculture and education careers, they are likely to receive lower lifetime earnings as a result.

The finding that sponsorship funding is rarely used for rural and village students suggests a potential for better utilization of sponsorship funds to produce gains in terms of wider social inclusion at the same time that aggregate manpower is being increased. The extent of this opportunity for greater social inclusion would be better defined if future studies ascertained both original and present residence of the students' families and included the two alternative measures of residence in a socio-economic status index along with parental education, occupation, and earnings measures.

The questionnaire return rates for the Brazilian and Indonesian students are the only ones sufficient to allow a within-nation analysis of the associations between sponsorship and field of choice. For Brazilian sponsored students, the study fields of greatest *relative* concentration are, in order, natural science/ mathematics, social science/humanities, and health. For sponsored students from Indonesia, business and public administration are the relatively most popular fields of study. In contrast, nonsponsored students from Brazil are relatively concentrated in the health and social science/humanities fields and nonsponsored students from Indonesia are found most commonly in the fields of science/mathematics, engineering, and business. While not definitive, these findings do suggest that policy reform predicated on an understanding of sponsorship and field of study choice patterns will probably require a country-specific analysis of sponsorship patterns and their effects and other correlates.

For both sponsored and nonsponsored students, personal preferences and employment needs dominate choice of field rationales. The employment needs justification is relatively more important for nonsponsored students, probably because they are less likely to be returning to a guaranteed public or private sector position.

Among Brazilian graduate students, 45.4 percent reported that personal preference was the main reason for choosing their field of study, while 31.5 percent reported employment needs as the main reason. In contrast, 35.9 percent of Indonesian students listed employment need as the first reason and only 29.3 percent of the Indonesians said personal preferences dominated their choice of field of study. Again, this reflects potential differences in culture and the student selection process which can be examined adequately only in a larger survey where the total sample size would allow more detailed cross tabulation and perhaps even regression analysis of multiple characteristics against the

field of study choice decision. Even the relatively simple form of analysis presented here indicates the valuable insight that can be attained from the consideration of the relationship between sponsorship and student choices.

The direct effect of sponsorship in this relationship may appear small. Only 6.9 percent of the graduate students listed donor finance as the *primary* determinant of their field of study. The donor finance consideration was most important to those in education (16.3 percent), social sciences/humanities (12.7 percent), and agriculture (10.3 percent). However, it is worth noting that 19.8 percent of the students felt that sponsorship restricted their field of study choice while 20.0 percent felt that their government imposed similar constraints.

In fact, we may infer from the evidence here that several factors are operating to moderate a *direct* relationship between sponsorship and student field of study choice. First, some sponsors may not concern themselves with field specializations except in the most general, unrestrictive manner. Second, donors may seek candidates for foreign study who have an aptitude and preference for the same fields of study as those the sponsor wishes to promote. Third, many recipients of sponsor aid may accept the restrictions of donors as such an inherent part of the assistance process as not to perceive them as constraining their actual choices. Fourth, for some candidates, their desired specialization may not be defined until after they find out what fields of study are eligible for funding. In any case, it appears appropriate to accept students' low ratings of sponsorship's direct influence as an indicator of the *minimum* influence sponsorship actually exerts over student choice.

The issue of the propriety of any restrictions on student choice cannot be dealt with directly on the basis of the data from the foreign student survey. One can note, however, that full-funding increases the sponsor's need for choice constraints, because a greater investment in each individual student has to be justified. If leveraging through the packaging of sponsor aid were pursued as a policy, the investment by sponsors in each individual student would be reduced and it would be easier for sponsors to tolerate a greater divergence between student choices and sponsor preferences.

To summarize these research results even further, six main categories of findings may be identified:

1. A large proportion of foreign students are nonsponsored but sponsorship is dramatically more important for graduate students;

2. For those students receiving sponsor assistance, there has been an inadequate attempt to leverage funding by making use of personal, family, or institutional resources;

3. The relationships between sponsorship and the intention to return home is very strong, and though even among nonsponsored students the proportion intending to return is large, it could probably be increased by the provision of small proportions of sponsorship aid tied to employment/return requirements;

4. There is no evidence that sponsorship is presently being used as a force to redress extant inequities or to promote social inclusion of under-represented groups even though there are indications that such funding could serve these purposes;

5. Sponsor support does influence field of study choices, and the overall influence is probably greater than indicated by the student responses to the survey's questions about direct sponsorship effects, because financing complements other influences on the student choice process; and

6. The residual policy problem is to identify better means to provide incentives and information to students so as to promote a better congruence between their abilities and preferences and the goals of the sponsoring agencies and institutions.

Thus, the research reviewed here has accomplished most of what was envisioned in the three research questions stated at the beginning of this report. The initial confidence shown in a carefully designed and administered survey approach to these policy questions has been justified by the quality of the data and the relevance of the inferences that have been derived. Future research is required. A larger study, restricted to graduate students, would allow greater detail in analysis. The current sample is too small to allow high level multivariable cross-tabulations or multiple regression approaches to be used with confidence. The greatest need is to disentwine the coincident conditions of sponsorship and gender, age, employment, and other influences on the student choice process. Yet the present study has revealed significant patterns, and these patterns have policy implications and recommendations.

The research shows a significant set of relationships between sponsorship and field of study decisions, although these relationships are moderated by a variety of factors like the gender of student; the form of financing; the level of study (undergraduate versus graduate); student attitudes, backgrounds, experiences, and plans; and even factors specific to the nation of origin.

While the complexity of the relationships makes policy analysis difficult and its application provisional, a variety of possible policy alternatives have been identified. Most important, it has been shown that less-than-full funding schemes

for foreign students deserve consideration. In the first place, these may increase efficiency. Further, they may not only increase equity, through greater social inclusion in the foreign student funding process, but also enhance the probability of return to the home country by students who previously were entirely self-supported.

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